

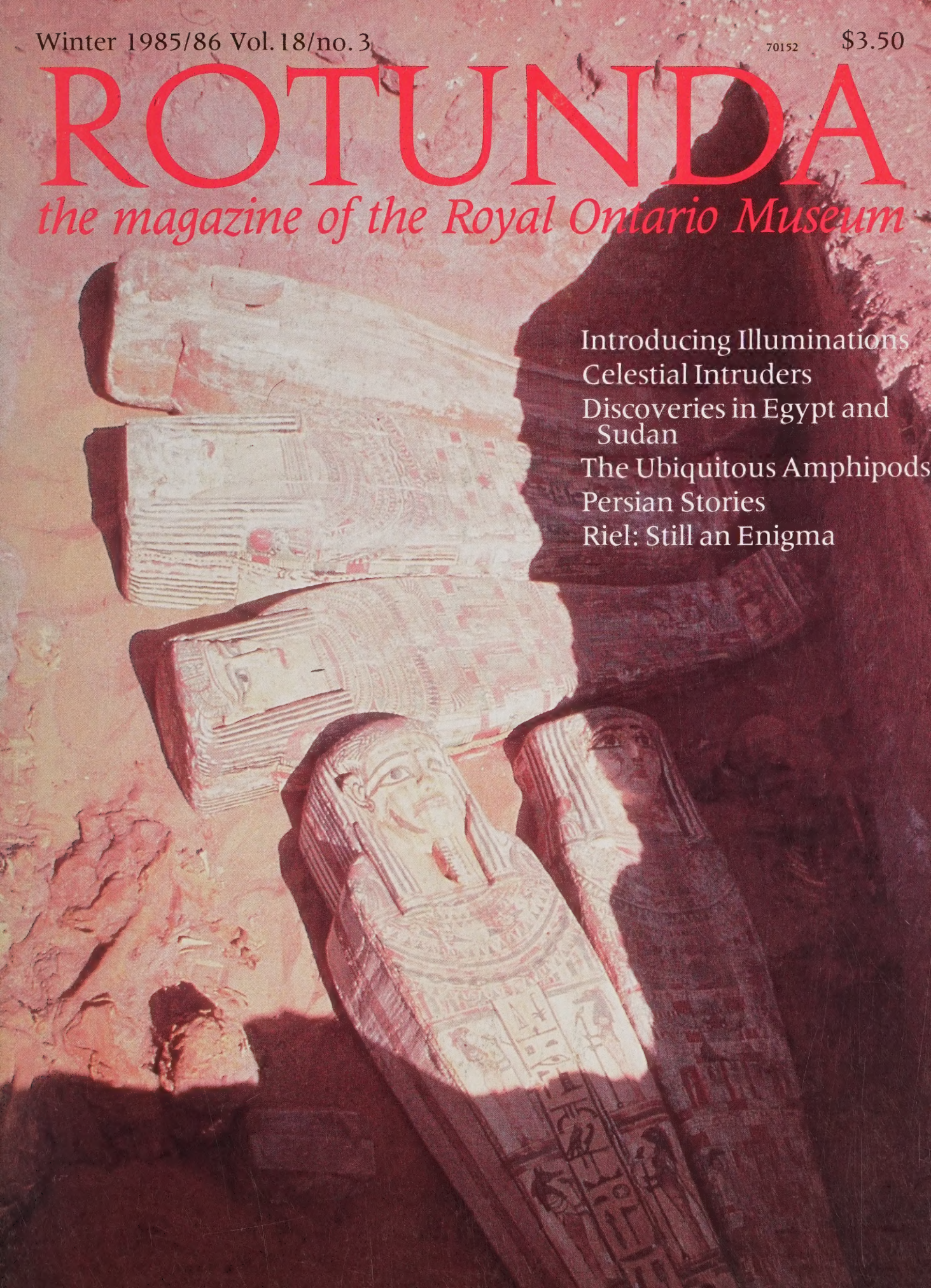
Winter 1985/86 Vol. 18/no. 3

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# ROTUNDA

*the magazine of the Royal Ontario Museum*



Introducing Illuminations  
Celestial Intruders  
Discoveries in Egypt and  
Sudan  
The Ubiquitous Amphipods  
Persian Stories  
Riel: Still an Enigma





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## Shedding a New Light

By the time this issue of *Rotunda* is distributed, *The Precious Legacy* exhibition will have left the ROM to continue its Canadian tour. In the last issue of *Rotunda*, special mention was made of the tremendous efforts of the Smithsonian Institution Traveling Exhibition Services and the various government and cultural agencies of the Czechoslovak Socialist Republic to realize the exhibition. At this time, we would like to extend our congratulations to our sister institution, the Glenbow Museum, in Calgary, for organizing the Canadian tour of this exhibition on behalf of National Museums of Canada.

If you are the type of reader who flips through magazines in order to decide what to read first, please just start at the front of *Rotunda* this time. There you will find *Illuminations*, our new collection of short articles and the *Rotunda Quiz*. The articles and the quiz will shed light on a broad range of subjects from research, field, and museology techniques, to recent discoveries, and new twists on what we presume is familiar.

As Tom Wujec points out, in the first feature article, comets have always been considered amongst the most spectacular of celestial events and as such they have been often associated with historical events and quasi-scientific theories. For the general public Comet Halley has become the universal comet for reasons that undoubtedly publicists rather than scientists would be more qualified to explain. Even though scientists have been predicting that this will not be one of the more visually dramatic returns of Comet Halley, most people are enthusiastically awaiting the event.

Our ideas of life in ancient Egypt and Nubia have also been distorted by overdoses of publicity given to the stupendous treasures and assorted curses revealed by extensive archaeological excavations along the Nile Valley between Cairo and Aswan. Discoveries about the cultures which existed in the regions to the south and to the west have been overshadowed as a result. As Alan Hollett and Krzysztof Grzymalski explain, modern techniques used to survey extensive regions are certainly less romantic than those associated with the more publicized excavations. LANDSAT and aerial photos are used in the mapping of the regions which are then carefully explored, most often on foot, in order to find and record sites for later excavation. Two archaeology teams from the ROM are about to recommence work in the Dakhleh Oasis of western Egypt and the Dongola Reach of northern Sudan. Their findings have been no less dramatic than those of the celebrated expeditions, for these archaeologists are unfolding the history of the contacts, cultural exchanges, and influences between the cultures of the Nile and those of the surrounding regions. Furthermore, the ancient cultures faced the challenge of surviving in a dry, hostile climate. As their successes and failures are revealed, they may offer insights for those faced with similar problems today in North Africa.

Living in an era that lauds miniaturization in technology has added new meaning to the old saying: It's the little things that count. So too in nature the little things can matter more to us than we previously thought. Amphipod shrimp are a perfect example. Edward Bousfield calls them mysterious "insects of the sea" because thousands of different species exist in vast numbers and in many kinds of aquatic environments. Yet scientists like Bousfield are discovering that individual species can tolerate only very specialized environmental conditions. By classifying these creatures according to acceptable conditions, we may have a new means of determining pollution levels.

Where does the real world stop and mythical embellishment begin? This question is posed by Ingeborg Luschey-Schmeisser when looking at the exotic scenes on the splendid tile spandrels from the buildings of the 17th-century capital of Persia. The ROM owns two sets of tiles which reveal an idyllic world of heroes and courtiers.

And on a more sombre note, merely a century ago Louis Riel drew Canada into her only civil war and for this crime he died on the gallows. Today opinion is divided about this controversial man. Perceptions of Riel were no more clear-cut in the 19th century, as Claude Rocan points out, and the political and social issues that Riel stirred then are uncomfortably familiar today.

We hope you enjoy this issue of *Rotunda*.

S.S.

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# ROTUNDA

*the magazine of the Royal Ontario Museum*

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**Cover:** A mass burial found in the Dakhleh Oasis, Egypt. Story on page 20. Photograph by Alan Hollett.

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## Potatoes: More than Rustic Fare

Not long ago, in a smart and expensive restaurant, a woman who likes her food glared disdainfully at the exquisitely arranged plate in front of her. "Take away this nouvelle nonsense", she demanded, "and bring me a potato." *Real* food was what she meant, sensible traditional stuff with some substance to it. She would no doubt be surprised to learn that this insistence on a potato to fill the role, particularly for a woman of her apparent sophistication, is so recent a phenomenon that her own great-grandmother might well have been astonished.

The now-so-common potato has a decidedly checkered past. While one 17th-century writer claimed potatoes "cheer the heart and are provocative of bodily lust," Scottish preachers denounced them from the pulpit because they weren't mentioned in the Bible. For a time the French were sure potatoes caused leprosy and the Swiss blamed them for scrofula.

Today people like Alex Caron, an Ontario wildlife biologist and organic farmer, devote much of their time to saving old varieties, sharing them with interested gardeners right across the country and beyond, and feel the effort is well worthwhile. How on earth did such a maligned vegetable manage to reach respectability? It's a complex and sometimes confusing history.

Neither root nor fruit, potatoes are swellings on the plant's underground stem. They can be as small as a walnut or nearly canteloupe-size; round, elongated, or curved; white, ivory, pale grey, yellow, red, violet, or nearly black. Native to the high Andes, the ancestors of *Solanum tuberosum* were knobbly, often bitter tubers that nonetheless allowed humans to live at altitudes where maize (a staple at lower levels) could not grow. Food historian Reay Tannahill dates the plant's domestication in Peru at 3000 B.C. Around A.D. 1100, an ingenious



Some of the potatoes grown by Alex Caron. The exotic B.C. Blue may be seen in the right foreground.

treatment was devised that counteracted the bitterness and preserved the tubers. After harvest, potatoes were spread on the ground and left to parch by day and freeze by night. They were then trampled to remove still more moisture, and left again until they turned as dry and light as cork. The resulting substance called *chũna* could remain unspoiled for years—a curious forerunner of modern instant mashed. By the time of the Inca Empire, which flourished from 1438 to 1533, several varieties were under cultivation.

Spanish conquistadors destroyed the Inca empire but they saved the potato, carrying it home around 1539. From this point, the tale gets tangled. It's not surprising that there's a dearth of specific documentation. Important as the potato is to us now, it was little more than an exotic garden curiosity when first introduced to Europe and few thought to record all its migrations. Even two centuries later, when potatoes were quite widely grown, Diderot and d'Alembert could be scornful. In the 1765 *Encyclopédie*

they wrote: "However it may be prepared, this root is insipid and mealy. It cannot be classed among the agreeable foodstuffs, but it furnishes abundant and rather wholesome nutrition to men who are content to be nourished. The potato is justly regarded as flatulent, but what are winds for the vigorous organs of peasants and labourers?"

What, indeed? The difference between life and death in many cases, for potato culture became intimately bound up with famines and war. Frederick the Great compelled peasants to plant the seed potatoes he distributed. The gesture wasn't well received at the time, yet the potatoes proved to be veritable god-sends during the Seven Years' War and the famine of 1770. Ironically, this acceptance ended tragically for one nation. By 1845 the potato was almost the sole crop grown in Ireland. Blight struck. With no other staple to fall back on, thousands starved and thousands more were forced to emigrate.

The potato journeyed back across the Atlantic to North America, probably some time in the 18th century.



A traveller in 1749 found plants at Albany, New York, but not in Canada. Later settlers would bring along favourites from their homelands. Traded among neighbours or given to relatives heading off to farther frontiers, varieties gradually spread and altered. These are the kinds of heritage plants that interest Alex Caron.

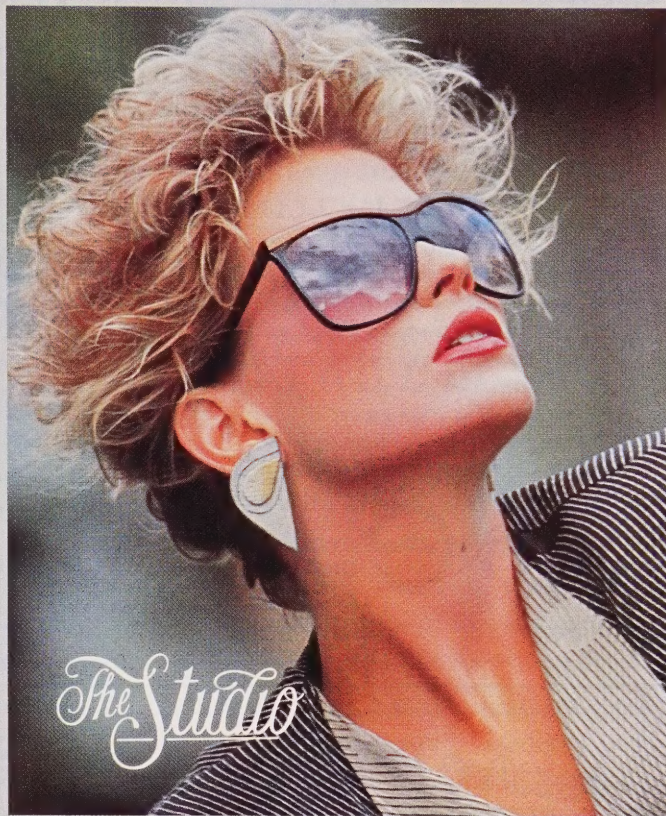
On his ninety-three-acre spread at Snowball, north of Toronto, where he raises a multitude of other plants and poultry, Caron concentrates on potatoes. This year he planned to grow 75 varieties. He ended up with some 110 kinds in the ground. People send him potatoes their families have raised for eighty years or more, the names long since forgotten. Others write in hope of finding a favourite that has been dismissed from regular catalogues. There's more to this than mere sentiment. The Heritage Seed Program, a safety net for any plant that's in danger of disappearing, is run in cooperation with the Canadian Organic Growers and encourages such exchange. A broad gene pool is essential to provide the diversity commercial endeavours sometimes threaten. Their interest tends to focus on developing potatoes that are easy to peel mechanically and that are high in natural sugar—the best varieties for making perfect potato chips and french fries.

Many of Alex Caron's crop wouldn't qualify. Take the B.C. Blue, its flesh an amazing royal purple, that can put pastel blue mashed potatoes on your dinner table. Or Siberian, a white potato, its light skin splashed with pink. "This would never be a good commercial potato," says Caron. "It has very deep eyes. If you mechanically peeled it you'd have nothing left."

That woman in the restaurant would probably appreciate Siberian. She might like to try Netted Gem and Gold Coin and Early Rose. And as she tasted them, she might even feel sorry for her great-grandmother, an upper-class soul, who in all likelihood considered potatoes coarse and rustic fare.

GLORIA VARLEY

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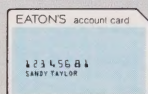
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### What is Taphonomy?

In June 1984, the ROM Department of Vertebrate Palaeontology, with the aid of field associates and volunteers, excavated a site in Sarasota County, Florida, known locally as "Little Jaws". It contains an abundance of jaws from small animals such as rabbits and muskrats. Nowhere else in the area are so many small bones of such a diversity of vertebrates to be found and this piqued our curiosity. Because a few worked-bone tools and no pottery had been found at the site, it was tentatively dated as seven thousand years old, or since the last ice age which ended ten thousand years ago.

We knew that our prospects for future finds could be improved if we could discover how the bones arrived at this particular site. Did they represent a mass kill of animals or a gradual accumulation? Were they transported by wind, water, human beings, or by some other means? Or had they been redeposited from a previous accumulation? In order to answer these and other questions, we decided to excavate the site taphonomically.

The word "taphonomy" literally means "laws of burial". Today we use the word to describe the whole process of transferring the organic remains of an animal into the sediment in which they will later be fossilized. Some of the stages in this process include the manner of death, decomposition, disarticulation of the skeleton, weathering, transport, sorting of bones or fragments by wind or water, final place of burial, and compaction. After these taphonomic events, the bones and bone fragments may become fossilized.

The study of taphonomy is relatively new. Although the term was first coined in 1940 it was not until the late 1960s that some palaeontologists started collecting taphonomic information. Today this kind of information is often collected because vast amounts of previously unrecognized data can now be gleaned from a fossil site.

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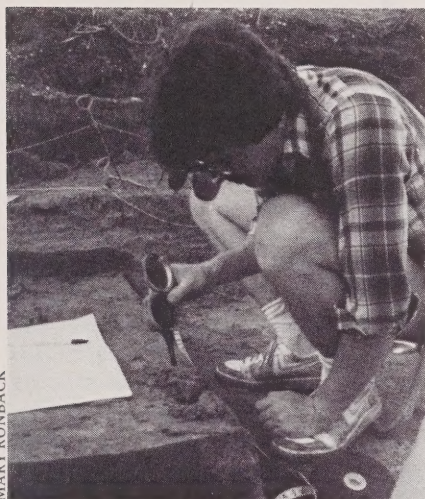
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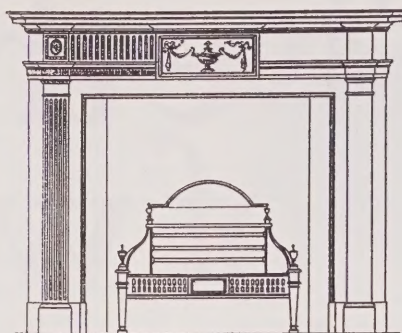


MARY RONBACK

Kevin Seymour is using a Brunton compass to record the orientation of a bone before it is removed from the site.

In the old method of fossil collecting, the bones were removed from the ground, and the surrounding sediment, if studied at all, was examined only to date the site and to get some vague idea of the environment of deposition. Now palaeontologists are more aware that sediment types and structures can provide much palaeo-environmental information. The horizontal and vertical relations between the bones and their orientation are now recorded, as in archaeological digs. From this information, patterns may emerge which may reveal how the bones were transported and sorted. Preserved bones of like size, weight, and shape can indicate the means by which they were transported to the final site and the length of time this required. These bones may also indicate the geochemical environment of burial. Any evidence of scavenging, weathering, and fragmentation is also noted.

Although laboratory identification and analyses continue, tentative conclusions about the "Little Jaws" site can be made at this point. Because many of the bones are fragmentary and there are no partial skeletons or associated bones, the bones were probably transported from their original burial place and redeposited. Even though it is likely that the bones were moved, all the animals represented in this deposit are members of one ecological com-



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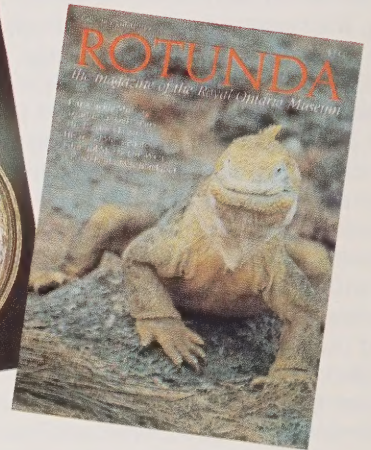
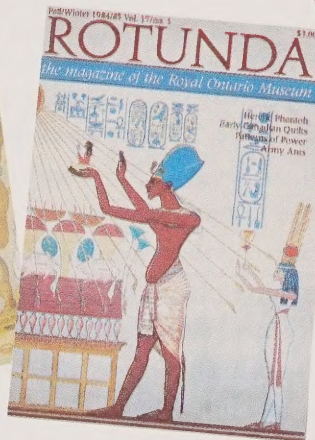
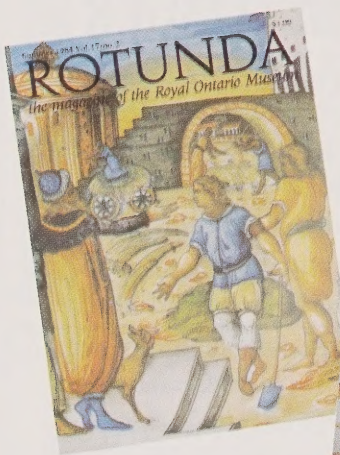
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munity, that of a freshwater marshy area. It is unlikely therefore that bones from other areas have also been introduced. The evidence for the presence of human beings (the bone tools) is very minor, suggesting that although there may have been a settlement nearby, this area probably only represents a prehistoric hunting and/or fishing site. The collaboration of palaeobotanists studying fossil pollen and archaeologists studying the bone tools will help to provide a more complete picture of the palaeo-environment.

KEVIN SEYMOUR

### A Method for Studying Delicate Skeletons

The ROM's ichthyology collection room, as most people would expect, contains row upon row of shelves holding bottles of pickled fishes. But the uninitiated visitor probably wouldn't expect to find also the many bottles filled with what appear to be coloured skeletons in a gooey liquid. These are cleared and stained fishes, used for the study of skeletons and they are as much a part of the collection as the more familiar pickled ones.

At the ROM, the evolutionary relationships among animals are studied by examining and comparing their physical characteristics. The greater the number of physical characteristics considered, the more accurate will be the determination of the relationships. In the study of fishes, skeletons provide information about many useful characteristics, partly because a great deal of the evolution of vertebrates is documented in the fossil record, which consists mostly of bones, and partly because of the great variation found in the skeletons of living fishes.

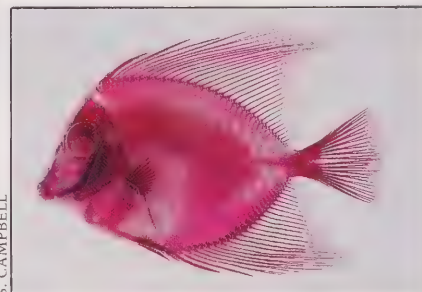
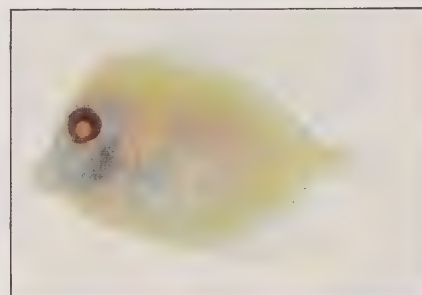
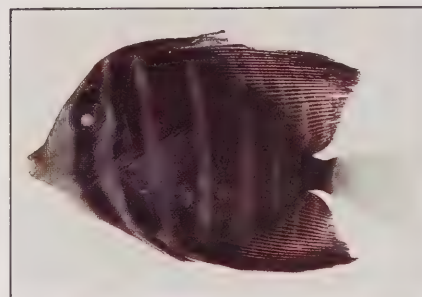
It is important to reveal a skeleton that is covered by muscles and skin without either damaging or distorting it. For land vertebrates, this is relatively easy. The animal is skinned and the flesh can be cleaned off the bones by hand or by flesh-eating beetles. Land vertebrate skeletons are sturdier than those of fish; the bones are fewer and hea-

vier in order to support the animals against gravity. Gravity isn't a problem for fishes, since they are largely supported by water. Their bones act rather as levers for the muscles to work against. When the muscles are removed, the skeleton tends to become distorted and to fall apart.

X-raying the specimens could overcome this problem. Although X-rays are useful, they provide only a two-dimensional representation of the three-dimensional animal, and it is sometimes difficult to see clearly what is hidden under the upper bones. The X-ray image is very grainy and details are lost, especially when the subjects are small fishes. Also we can't dissect an X-ray picture to examine individual bones.

The solution is to clear and stain. The skin and muscle are made colourless and transparent, and the visibility of the skeleton is enhanced by staining the bones red and the cartilage blue. To make the skin colourless the animals are bleached in hydrogen peroxide. To get rid of the muscles or at least to make them transparent, a solution of the enzyme Trypsin is used to digest them. Trypsin (which can also be found in our intestines) digests only the muscles; it does not affect the skin or ligaments. The cartilage is stained with Alcian Blue, and the bone with Alizarin Red. The cleared and stained specimens are stored in glycerine (the gooey liquid), which helps to ensure that the animals remain transparent.

The cleared and stained fishes may also be used for other studies such as the effects of bone stress, functional morphology (the form of body parts as it relates to their function), and growth. Other vertebrate groups may be cleared and stained by the same processes if they are small enough. The ROM Department of Ichthyology and Herpetology also clears and stains amphibians and reptiles. A recent project in which the clear-and-stain process was used was conducted by staff herpetologists Bob Murphy and Ross MacCulloch. They are trying to discover whether spring peepers can be "left-handed" or "right-handed".



S. CAMPBELL

In the top photo, the fish has already been stained with Alcian Blue. In the middle photo, the fish has been bleached and the blue stain clearly shows the cartilage. In the bottom photo, all muscles have been digested by Trypsin and the bones are stained with Alizarin Red.

Other kinds of tree frogs display "handedness", because of an overlap of bones in their shoulders called *arcifery*.

Frogs were released to see if they would jump to the right or to the left. If they jumped straight ahead, it was noted whether they favoured either of their forelimbs when they started to walk after the jump. (The occasional recalcitrant frog had to be prodded into action.) The frogs were then caught and grouped according to their actions. They will be cleared and stained and their shoulder bones examined to see if the orientation of the overlap consistently corresponds to the direction of the jumping.

STEPHEN CAMPBELL





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## Rotunda Quiz: A Day in the Life

- social consciences, park there anyway. Especially when it's raining. Especially people who drive expensive cars. Are your suspicions justified?
3. You get a call to see your boss just after you've poured yourself a fresh cup of coffee. You want the coffee to remain hot as long as possible. Should you add the cream right away, or just as you get to his office?
4. The news isn't good. Your boss tells you that the big contract is going to be handled by your bitter rival in the office. As your boss assures you that it has nothing to do with you, you wonder

ing to do with your abilities—that he really thinks you’re GREAT—you notice that when he smiles, only his mouth curves up. There’s no wrinkling around his eyes, no lowering of his eyebrows, and his lips are tight at the corners of his mouth. What’s the problem?

5. After a thorough (and expensive) car wash, you head home. Naturally it begins to rain—a hard, slanting rain. Should you drive faster than usual, to minimize the number of drops hitting your car, or does driving faster simply run you into the path of drops that would otherwise have missed you?
6. Finally, the end of a long day. You sit down, switch on the TV, and all you can get are Roadrunner reruns—the kind of cartoons in which the villainous coyote runs full tilt off a cliff, continues in a straight line, suddenly stops in mid-air, realizes what's happened, and falls like stone. Is this the way the coyote would fall in real life?

Jay Ingram

The answers are below.

In this case there are two problems: the rain from above that strikes your head and shoulders, and the rain that you walk into with your body. The bigger you are, the more rain you sweep through as you walk. You can't do much about the first problem, but there is one solution to the second (suggested in *The American Journal of Physics*): travel lying prone on a skateboard.

6. If you agree that the coyote would run straight out off the cliff, stop in the air, then fall straight down, you're wrong. But you're in good company: that's what the 14th-century Arab philosopher Avicenna thought too. If you said the coyote would move straight for a while, then gradually curve down as he loses speed, you're wrong again. But that's also what the 14th-century philosopher Albert of Saxony thought. If you guessed that the coyote's fall would form a parabola, a gradually curving path right from the edge of the cliff to the ground, you're right.

hotter. Even better would be to float whipped cream on the top of the coffee, à la Irish Coffee. The whipped cream might cool the surface a little, but insulates the rest of the coffee.

4. Your boss could well be lying about your abilities. Close examination of faces has shown that so-called "false smiles"—with the mouth only—and smiles with "contempt" leaking through—tightening the corners of the mouth—are more common when people are lying. If his voice is higher pitched than normal, or if there are more pauses, and ums, and ahs in his speech, then it's very likely he's deceiving you.

5. If the rain is slanting against your windshield, you'd do better to drive as fast as possible. But if it's slanting against your rear window, then the trick is to drive at the same speed as the horizontal component of the rain's velocity—just keep pace with it. Even if the rain is falling straight down, and you're walking, you're better off to walk as fast as possible.

1. It's close, but the pig is estimated to have been domesticated around 7000 B.C., just ahead of cattle at 6500 B.C. The chicken is a latecomer, being domesticated in India around 2000 B.C. The pig and the cow were tamed in the Middle East.

2. Two studies in the journal *Perceptual and Motor Skills* report that it's true that abuse of the handicapped parking areas is more common in bad weather, in outdoor lots of course, but that there is no preponderance of expensive cars. Compacts, subcompact— they all do it.

3. Paradoxically, it's better to put the cream in right away, if you want to keep your coffee hotter longer. The temperature of the coffee does drop as soon as the cold cream is added, but that's not the only effect. Adding the cream reduces the loss of heat by convection, the process in which coffee at the top of the cup is cooled by the air, falls to the bottom of the cup, and is replaced by more hot coffee. Reducing convection keeps the coffee



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# Celestial Intruders

*The many stories about Mr Halley's comet far outshine what we'll see of the comet's return in 1985–86.*

Tom Wujec

*Opposite page:* The European Space Agency has launched the probe called Giotto that will plunge to within five hundred kilometres of the nucleus of the comet. Giotto will have four and one-half hours to study the comet and hopefully it will reproduce the first high resolution image of the comet's nucleus, revealing its size, shape, and texture.

*Inset, opposite page:* *Adoration of the Magi* (c. 1304) by Giotto; Scrovegni Chapel, Padua, Italy. Comet Halley returned to earth in 12 B.C., too early for it to be a candidate for the Star of Bethlehem. But it was seen by the Florentine artist, Giotto di Bondone, in 1301. In his fresco he portrayed the Star of Bethlehem as the comet. Giotto must have observed the comet carefully for he painted the first truly accurate image.

COMETS, those ghostly intruders of the sky, have startled, fascinated, and frightened humanity for centuries. For the ancients, comets were mysterious and supernatural, symbolizing the unknown. Sometimes dim, sometimes bright, these smears of light arrived without warning and stood against the fixed background of stars for a few weeks or months. Because it was generally believed that celestial objects affected the affairs of human beings, the appearance of bright comets, among the most impressive of celestial objects, was thought to portend important events.

Comet lore played a part in almost every ancient culture. Comets were thought to shape the destinies of rulers and of entire nations, noblemen and peasants alike. The Chinese, as avid star gazers, divided the sky into provinces, each corresponding to a region on earth. They thought of comets as celestial envoys that carried both good and bad messages from one province to another.

On a more ominous note, the Aztecs believed comets were signs from Quetzalcóatl, the powerful deity of earth and water. When a brilliant comet appeared in 1499, it was thought that he would soon appear. Twenty years later the arrival of the Spanish conquistador Cortez, on the shores of Mexico, was interpreted as the return of Quetzalcóatl. This belief helped to seal the fate of the Aztecs.

Many people expected to see comets each time a great ruler died. The death of Attila the Hun was said to have been marked by two comets, those of A.D. 453 and 455. When Charlemagne, emperor of the West, died in the 9th century, no comet was seen. But to keep up the tradition, a brilliant comet was invented and duly recorded.

During the Middle Ages, the interpretation of hairy stars changed. They were no longer thought of simply as accompanying the death of powerful individuals, but were now taken to be omens of all disasters. Their arrival foretold famine, pestilence, flood, fire, war, drought, and higher taxes. In fact, the root meaning of the word "disaster" is "evil star".









This drawing of the comet of 1528 is from the work of Ambroise Paré. The comet was said to be blood-red, horrible, and frightful, causing death to many.

Many people thought these evil stars exerted a tangible force. According to Giorg Busch, a 16th-century astrologer, "Comets are formed of human sins and wickedness formed into a kind of gas and ignited by the anger of God. This poisonous stuff falls down on people's heads and causes pestilence, sudden death, . . . and bad weather."

It was also popular to think of comets as supernatural apparitions. Ambroise Paré, surgeon to four French kings, had this to say about the Great Comet of 1528:

This comet had the colour of blood. It had a bent arm holding a great sword ready to strike. Flanking the sword were axes, knives, more blood-red swords, and hideous human faces with beards and bristling hair. It was so terrible and so frightful and it produced such terror in the vulgar that some died of fear and others fell sick.

It is not surprising that comets made a tremendous impact on the human imagination and that their irregular, mysterious, and occasionally spectacular appearances inspired terror. On the average, a bright comet appeared every five years, and, inevitably, it would be blamed for any current or recent misfortune.

In 1664, a comet shone in the sky above London. It seemed to move slowly and solemnly, taking several weeks to cross the sky. The English thought that this celestial intruder had brought a slow and horrible judgement on their land—the great plague of 1665. One year later, another comet appeared. It was reported to have been swift and furious, bright and sparkling, even making a hushed, rushing sound. Because this hairy star shone brightly, like a burning torch, it was thought that it was responsible for a sudden, swift, and fiery judgement—the great fire of 1666.

These superstitions were so widespread that a 17th-century astrologer, John Gadbury, classified the effects of comets according to their appearance:

Dart-like comets caused poor crops.  
Red comets signalled famine and rising prices.  
Rod-like comets foretold drought and scarcity.  
Comets with hairy tails warned of revolution.  
Comets with great tails were definite signs of war.

Comets touched the imagination of all who saw them. William Shakespeare expressed some of the popular beliefs about comets in two plays:

When Beggars die, there are no comets seen;  
The heavens themselves blaze forth the death of princes.  
*Julius Caesar*

Comets, importing change of times and states,  
Brandish your crystal tresses to the sky  
And with them scourge the bad revolting stars  
That have consented unto Henry's death.  
*Henry IV, Part 1*

After seeing the great comet of 1618, John Milton also expressed some fearful views of comets:

...Satan stood  
Unterrified and like a comet burn'd  
That fires the length of Ophiuchus huge  
In Artick sky, and from its horrid hair  
Shakes pestilence and war.

*Paradise Lost*

Comets have also been objects of scientific speculation throughout history. Perhaps the most influential scientific ideas about comets among the ancients came from Aristotle in the 4th century B.C. He thought they were atmospheric phenomena. Aristotle described comets as "hot, dry, exhalations of the Earth", presumably a kind of vapour released from the ground. The gas mixed with the upper atmosphere and burst into a flame which could burn for several months. For almost nineteen centuries, Aristotle's exhalation theory remained unchallenged. Comets were thought to be atmospheric events, like clouds, rather than celestial objects, and as a result, they were more often than not excluded from astronomical treatises.

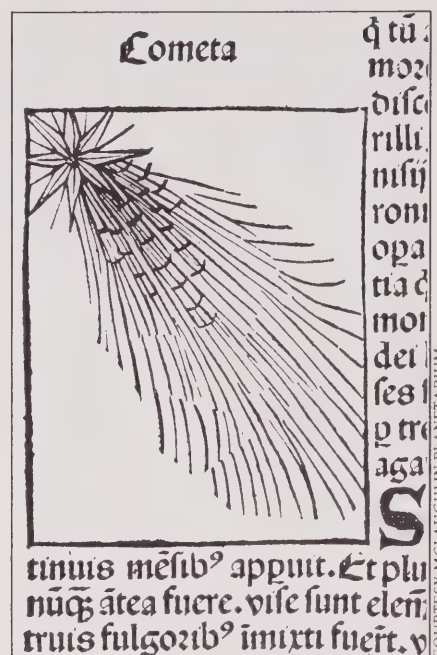


The renewed quest for scientific knowledge that characterized the Renaissance set the stage for further research of comets. Armed with newly developed instruments, scientists postulated new ideas and arrived at a clearer understanding of these natural phenomena. In 1541, after having seen five comets in relatively rapid succession, the Austrian Pietrus Apiannus discovered that comet tails always point away from the sun. (The Chinese had discovered this centuries before.) This suggested that there was a strong connection between the sun and comets. Tycho Brahe, the great Danish astronomer, tried to measure the distance from the earth to the Great Comet of 1577. He discovered that the comet was much further away from the earth than the moon, and therefore could not possibly be part of the earth's atmosphere. Johannes Kepler, the German astronomer who first developed the laws of planetary motion suggested "there were more comets in the sky than fishes in the sea." But the answers to the more fundamental questions about comets—where they came from and how they moved—were found by a creative and intelligent thinker named Edmund Halley.

Edmund Halley was appointed as England's second Astronomer Royal in 1719. He first became intrigued with comets when he saw the Great Comet of 1682. Using the mathematics developed by his close friend Isaac Newton, he charted the orbits of about two dozen comets for which accurate observations existed. Halley noticed that those of 1531, 1607, and 1682 had remarkably similar paths.

Taking the next logical step, Halley developed the idea that would make his name famous. He reasoned that the Great Comets of 1531, 1607, and 1682 were not three separate comets, but three separate returns of a single comet, occurring approximately seventy-six years apart. He predicted that the comet would return in 1758.

Halley did not live to see the return of his comet for he died in 1742 at the age of eighty-six. Sixteen years later, however, on Christmas night 1758, Johann Palitzsch, a German amateur astronomer, sighted a faint patch of light. The comet had returned as predicted. Though Edmund Halley was not the first to see his comet, he was the first to predict its return. Because of this, the comet is named in his honour.



Probably the oldest illustration of Comet Halley is contained in *The Nuremberg Chronicle*, published in 1493. It is a woodblock print which recounts the events of A.D. 684, a year in which Comet Halley appeared.

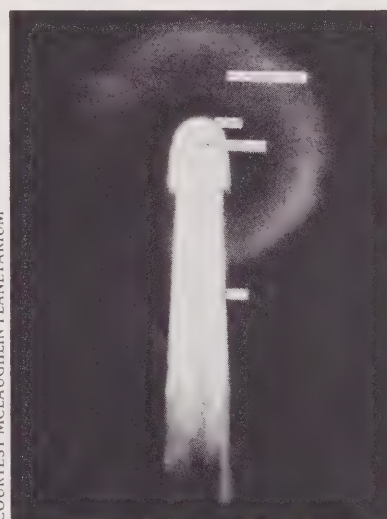
## The Anatomy of Comets

Comets have four component parts: nucleus, coma, tail, and hydrogen cloud. The nucleus, the only solid part, is a frozen chunk of ice composed of water, methane, and ammonia, peppered with microscopic grains of dust. By astronomical standards, the nucleus is tiny, measuring no more than five to ten kilometres across.

The crust of the nucleus is a mixture of loosely packed ice and snow, powdered rock, and grit. As the comet nears the inner solar system, the sun gently warms its surface. In the near vacuum of space, ice does not melt but undergoes a process called sublimation; that is, it vaporizes without passing through the liquid state.

As the comet swings closer to the sun, its ice thaws faster and gas erupts from many sites. Like a field of geysers, jets of vapour pour out into space. Crevices and rills open up. Embedded grains of dust and grit are freed and carried away from the surface by the force of the gas jets. The coma is a cloud made up of the gas and dust, and it envelops and hides the nucleus. It is capable of growing to a million kilometres across.

The tail is a stream of dust and gas that trails away from the coma. Like a flag streaming in the wind, it is forced out of the coma by the pressure of solar radiation. Though the tail is certainly the most spectacular part of a comet—a tail can grow to 100 million kilometres in length—it contains very little matter. One description of a comet's tail is that it is "as close to



being nothing as anything can be, and still be something."

The hydrogen cloud is an extension of the coma. It is a tenuous cloud of hydrogen surrounding the coma and the nucleus.





Portrait of Edmund Halley (1712) by Thomas Murray; collection of the Bodleian Library, Oxford University. Edmund Halley made a great number of contributions to science beyond his discoveries about the comet that bears his name. He wrote papers on underwater exploration and the difference between true north and magnetic north. He meticulously mapped the southern skies. He devised a method of accurately measuring the distance from the earth to the sun. He also encouraged his close friend Isaac Newton to write and to publish *Principia Mathematica*, a text which, among other things, established the Law of Gravitation. In fact, Halley personally financed this crucial work which is still used today for space missions.

The comet will not be visible in a city sky, but in a dark country sky it may be visible through a pair of binoculars. Use the chart to locate Comet Halley. First emerging as a faint smudge of light in the November evening skies, it will grow steadily brighter each evening. By January, for the first time in seventy-six years, it may be barely visible to the naked eye and it may show the first signs of a tail.

In February Comet Halley will swing around the far side of the sun, and will therefore be invisible. In March it will reappear in the eastern morning sky for a few weeks and in mid-April it will return to the western evening sky. As it leaves the inner solar system, it will grow dimmer.

Comet Halley has returned to the skies of earth many times at intervals of seventy-three to seventy-nine years. Modern astronomers have accurately plotted the orbit of the comet with computers and have calculated where and when it should have appeared in earlier times. By searching into historical records, they have determined that it has been actually seen during at least twenty-seven returns. Like an exclamation mark in the sky, it has punctuated human history, and emphasized important events.

Most early documentation has come to us from Chinese astronomers who kept meticulous records of countless celestial events. Though the bright comet of 1059 B.C. may have been Comet Halley, the first confirmed sighting was in the year 240 B.C. Both Babylonian and Chinese observations in this year confirm its naked-eye visibility.

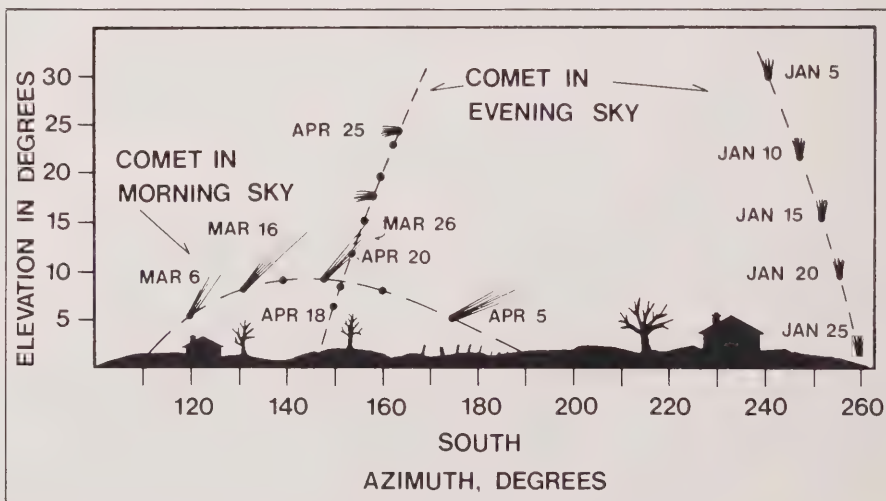
In A.D. 66, the comet's return was again spectacular. The tail stretched across almost a third of the sky, and looked like a sword dripping with blood. It was interpreted as one of the signs that foretold the destruction of Jerusalem by the Romans. A thousand years later, in 1066 the reappearance was thought to be an omen of the defeat of King Harold by William the Conqueror. In one scene from the Bayeux Tapestry, King Harold is pictured tottering on his throne and the inscription at his side states that the peasants are in "awe of the star".

Tradition says that Pope Calixtus III tried to excommunicate the comet as an agent of the devil. He decreed that church bells should be rung, and that all congregations should pray against the Turks, the Devil, and the Comet. When the Turks had been defeated, it was agreed that the comet was on the side of the Christians.

It was the 1682 return, the first to be seen through telescopes, that inspired Edmund Halley to examine comets closely. The 1758 return confirmed that some comets were periodic. In 1835, the comet was scrutinized carefully with large telescopes and the sun's action upon it was observed and recorded. In 1910, the first photographs of the comet revealed the development of the tail. At the same time, an analysis of the comet's light with a spectroscope gave astronomers clues to the comet's chemical makeup.

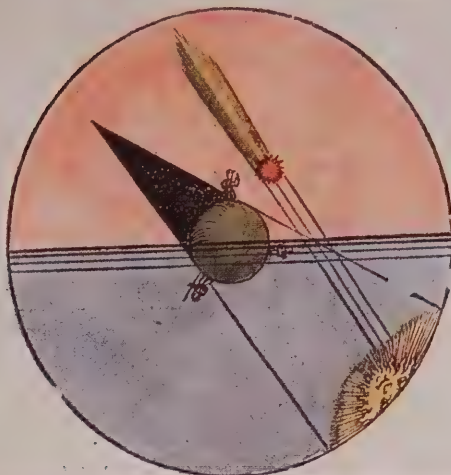
This scientific knowledge about comets was exploited in very non-scientific ways during the last return in 1910, to produce the same type of public phobias prevalent in earlier times. It became known that the tail contained trace amounts of cyanogen, a poisonous gas, though scientists also knew that the amounts were too slight to pose any danger. Nevertheless, when the earth passed through the tail, thousands of people sealed their windows with tape and rags, and huddled with their families in basements. Others made gas masks and inhalers to protect themselves from the "poisonous gases".

Two entrepreneurs from Ohio made a fortune in Texas by peddling comet pills. These specially bottled sugar tablets would supposedly protect people from the comet's "deadly vapours". When a local sheriff tossed the pair into jail, a





(Comet.  
1531.)



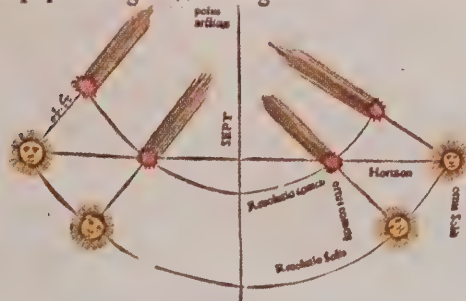
## DE OCCVLATIONE ET APPARITIONE Cometæ. Caput decimumsextum.



AMETSI Cometæ 13 augusti die mihi cōspectus sit primo, non desunt tamen qui eundem se vidisse sexto septimoq; affirmant, verè autem omnibus ab occidēte paucis ab oriente visus est, & profecto fieri non potest, quin ita factum sit, licet non omnibus apparuerit, non enim ita multis post ortum suum diebus videri mane desit, ea de causa, quod subinde magis ac magis cōsmicum in ortum festinavit. Nam die 18, vt videre in sequentibus est, oriri cum ipso Sole cepit, quocirca propinquior erat iam Soli 13 die quam vt cerni poterit, ortum parante iam Sole. Inde factum est, vt plerisq; imperitioribus aliis ab eodē cometæ fuisse putaretur, quali duo forent, vnus in oriente, alter in occidente, nescientibus tam in ortu quàm in occasu apparere posse, non fecus atq; stellā aliam. Id quod etiam Mattheo Palmerio Florentino imposuit in chronicis suis asserenti binos in Ianuario cometas fulsisse, anno post Christi 729, aliumq; Solem anteisse, alium vero subsequutum, cum reuera non duo, sed vnus & idem fuerit, nunc ante nunc post Solem, ea qua dixi ratione, lucens. Sed ad rem, Sol cum 29 Leonis gradum possederet, occidebat hora post meridiem 6 mi. 54, Cometæ vero hora 9 mi. 55, si declinatio eius ascensioq; recta considerentur. Vnde liquet Solem fuisse sub horizonte horis 10 mi. 12, & Cometam horis 4 mi. 10, cuius ideo ortus hora 2 mi. 10 post noctis medium esse debuit. Cum vero de ortu & occasu cometæ loquor, non subaudias volo, mihi visum per instrumenta eo tempore quo horizontem contigerit Cometæ, illud enim abundè declinatio ascensioq; recta eius semel cognita fugerunt, & si vero per instrumentum id effem conatus, conficere tamen nequaquam potuisset, quoties enim horizonti propinquior fieret 3 vel 4 gra. intervallo, flamma eius extingui omnino videbatur, adeo, vt aliquando iam me sub nubila condi creditus sit, donec admoneret Plinius libro naturalis historię 2. cap: 25, Cometæ in occasura cœli parte nunquam esse, id est, nunquam apparere. Is enim genuinus Plinii intellectus est, ni fallor, quem cō libentius ego quoq; admitto, quoniam ita oculis esse compererim. De vsu meteoroscopij nihil amplius agā, sed post finem cometæ, motum quoq; diurnum per meteoroscopium inuenire docebo, sufficiat autem hanc vnam obseruationis methodū ita fuisse, & quasi per membra tradidisse, in sequentibus enim nil præter obseruationes meras per meteoroscopium consequutas proponem. Figuræ præterea sequentes ostendunt altitudines Cometarum dumtaxat, supra horizontem existentium tempore quo Sol occumbit, simili ter quā profundus Sol exiret sub finitore cometæ eundē scandere,

Sententia Plinii de occasu Cometæ

## SOLIS ET COMETÆ ORTVS OCCA susq; qui contingunt 13 die Augusti.



## DECIMO QVARTO AVGVSTI DIE secunda Cometæ obseruatio peracta est.

(Comet.  
1531.)

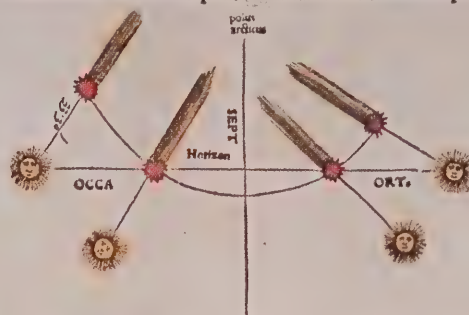
- ¶ Altitudo Cometæ supra horizontem gra. 8 mi. 29
- ¶ Azimuth Cometæ ab occasu Septen. versus gr. 45 mi. 22
- ¶ Altitudo extremitatis caudæ graduū 23 mi. 18
- ¶ Azimuth extremitatis caudinæ Septentrio. gra. 57 mi. 38

Hæc sequentia ex obseruatione confurgunt.

Latitudo Cometæ gra. 23 m. 2, Locus Cometæ gra. 23 mi. 39 N.  
Declinatio Cometæ gr. 35 m. 12 Sept. Ascensio recta Co. gr. 155 m. 5  
Co. Mediat cœli ho. 11 añ. Amplitudo, or. & occ. 60 gr. 27 m. 59.  
Occa. Cometæ hora 9 m. 32 post me. Cometæ occidit cū 23 gra. m.  
Distantia Cometæ à Sole gr. 23 m. 40, Ortus Cometæ hora 2 mi. 28.  
Loc' extremi, caudæ gr. 19 m. 18 N., Latitu, extre. gr. 39 m. 45 Sept.

Situs Cometæ occasus tempore.

Situs Cometæ ortus tempore.



## DECIMO QVINTO AVGVSTI OB seruatio tertia facta est.

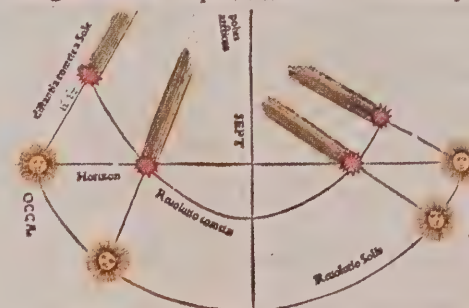
- ¶ Altitudo Cometæ supra horizontem gra. 9
- ¶ Azimuth Cometæ ab occ. versus Sept. gra. 41 mi. 22
- ¶ Altitudo extremitatis caudæ supra horizon. gra. 19 mi. 8
- ¶ Azimuth huius extremitatis gra. 50.

Hæc autem obseruatio collegitea quæ sequuntur.

Latitudo Cometæ gra. 22, Locus verus Cometæ gra. 24 mi. 29 N.  
Decl. Cometæ gr. 33 m. 19 Sep. Ascensio recta Co. 159 gra. 20 mi.  
Latitudo extremitatis caudæ ab ecliptica gra. 34 mi. 22  
Locus verus in ecliptica extremitatis caudæ 21 gra. 2 mi. N.  
Distan. à Sole gra. 23 mi. 31, Arcus diurn. Cometæ horæ 18 mi. 34  
Occa. Cometæ ho. 9 mi. 44 post. Or. Cometæ hora 3 mi. 10 ante.  
Hodie Cometæ, heliacæ accidit, vt nō amplius ante Solis ortū cernere.

Situs Cometæ occasus tempore.

Situs Cometæ ortus tempore.



## DECIMO SEXTO DIE AVGVSTI consideratio Cometæ quarta.

- ¶ Altitudo Cometæ supra hori. gra. 9 mi. 43
- ¶ Azimuth Cometæ ab occ. versus Sept. gra. 35 mi. 13
- Super caudā nihil vltcrius agatur, sufficiunt enim priora, per quæ satis liquet à Sole caudā mutari, quocirca in posterū de hac supersedebimus.

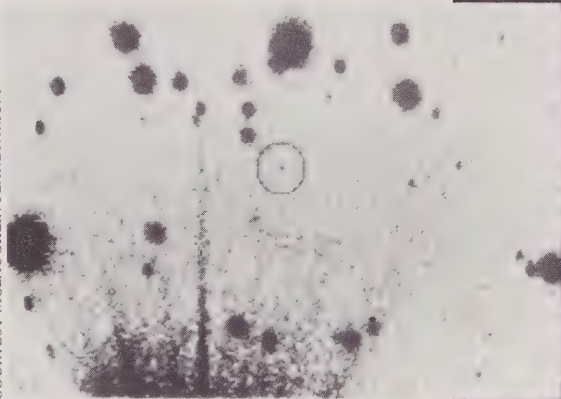
Talia ex obseruatione constant.

Latitudo Cometæ ab ecliptica gra. 22 mi. 11  
Verus locus Cometæ in ecliptica gra. 4 mi. 32 m.  
Declinatio Cometæ ab æquatore 30 gra. 11 mi. Septentrio.  
Ascensio recta Cometæ 165 gra. 31 mi.

Petrus Apiannus of Ingolstadt was the first western astronomer to notice that comet tails point away from the sun. These illustrations from a ROM facsimile of Apiannus' work,

Astronomicum Caesarium, are probably based on the 1531 return of Comet Halley.





*Above:* On 20 October 1982, the astronomers D.C. Jewitt and G.E. Danielson detected Comet Halley by the use of a 5.1 metre telescope on Palomar Mountain. Seen for the first time since 1910, when the comet was still beyond the orbit of Saturn, it appeared only as a faint smudge on a computer screen. The comet was sixteen million times dimmer than what the unaided human eye can perceive.

*Right:* On 13 May 1910, Comet Halley appeared next to the planet Venus. This Lowell Observatory photograph, taken that day, reveals the two tails characteristic of many comets. The main body of the tail is predominantly dust. The appendage below the main tail is a disconnected plasma tail made up of electrically charged atoms that glow with iridescent splendour.



mob collected outside the jail-house and demanded that the hucksters be released so that they could produce more pills. The sheriff was forced to comply.

Unfortunately during the 1985–86 return of Comet Halley, the comet will not pass close to the earth, and it will be poorly placed in the sky for viewing from the northern hemisphere. (The comet will stand high in the sky of the southern hemisphere.) From Canada, Comet Halley will, at best, appear small and dim.

Even though this return is not the most spectacular, Comet Halley will be among the most intensely studied objects in astronomical history. Amateur and professional astronomers will monitor it with telescopes twenty-four hours per day. A fleet of five spacecraft sent by Japan, the Soviet Union, and the European Space Agency, will inspect it at a closer range than ever before.

To help promote, coordinate, standardize, and preserve each observation, the International Halley Watch, a global network of observers, has been set up with headquarters at the Jet Propulsion Laboratory in Pasadena, California, and the University of Erlangen in Germany. The Watch will promote clear scientific communication and understanding across political boundaries.

Never before has so much attention been focused on what would otherwise be an insignificant speck of cosmic grit. Perhaps it is because of the history and folklore associated with Mr Halley's comet; or perhaps because this comet is a symbol of the transition from superstition to understanding. In any event for a few moments, a brief moment in history, Comet Halley will reveal a few tantalizing clues to the mystery that surrounds us and then return again to the frozen refuge of distant space.

*Tom Wujec is a producer at the McLaughlin Planetarium. He received his B.Sc. in astronomy and psychology from the University of Toronto in 1982.*



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# *the Sands*

*Away from the beaten track of the Nile Valley between Cairo and Aswan, archaeological teams from the ROM Egyptian Department track the sites of ancient cultures in Egypt and Sudan.*

**S**EPARATED by several hundred kilometres of hot desert sands, two groups of archaeologists from the Egyptian Department of the Royal Ontario Museum have left the beaten track of the Nile Valley between Cairo and Aswan to study the story of man in the Dakhleh Oasis of western Egypt and in the Dongola Reach of northern Sudan.

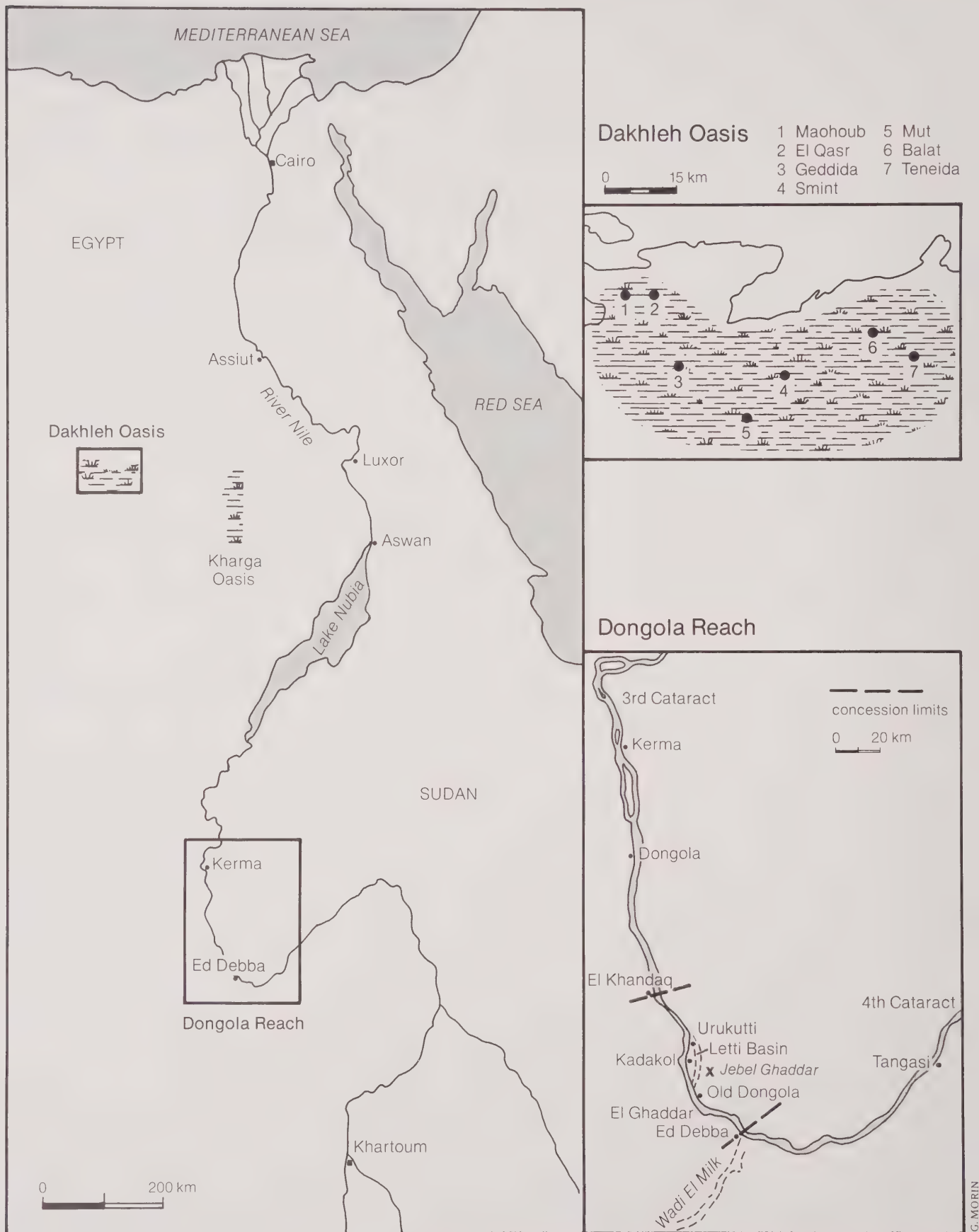
In many ways both projects are remarkably similar in spite of the very different geographical regions and ancient cultures being explored. Both involve extensive surveying of relatively large areas in order to locate and identify archaeological sites of all periods, rather than the traditional excavation of a single site. In this way, an accurate history and pattern of settlement of past inhabitants can be determined, as can the complex matter of contacts, exchanges, and influences between the cultures of the Nile Valley and those to the south and west of it. As a result, ROM archaeologists hope to gain greater insights into the interaction between man and his environment in ancient times.

At present, the Dakhleh Oasis Project has finished its survey and is now starting excavation of selected sites. The Dongola Reach Project is still at the survey stage, with full-scale excavations still a couple of years in the future.

The Dakhleh Oasis as viewed from the sand dunes

*Inset:* Rescue excavation of a tumulus near Jebel Ghaddar, Sudan







Situated almost 320 kilometres west of the Nile Valley (about 600 kilometres southwest of Cairo), the Dakhleh Oasis nestles at the foot of a five-hundred-metre escarpment surrounded by the scorching, super-arid desert of western Egypt. It hasn't rained here in any significant amount for over thirty years. With patches of cultivation scattered over an area of almost two thousand square kilometres, the oasis relies totally on artesian water for its existence. The origin of this water is very much in doubt, but it is probably the remains of the most recent rainy period which ended about 3000 B.C.

During the 1970s, the Society for the Study of Egyptian Antiquities, a Toronto-based Egyptological Society, obtained a licence to survey and to excavate in the Dakhleh Oasis. Mr Geoffrey Freeman, chairman of the Society, invited the ROM to participate. In 1977 Mr Freeman and Professor A. J. Mills, then associate curator of the Museum's Egyptian Department, made a logistical trip to Dakhleh and the following year the survey began.

Beginning at the western border of the oasis at the foot of Gebel Edmonstone (named after the first European visitor, Sir Archibald Edmonstone, in 1819) the survey team literally walked over the entire surface of the oasis. In 1983 it reached the eastern end on schedule, having recorded more than 425 sites. These sites vary from small clusters of flints to two large Roman towns, from Neolithic graves to a Roman temple, buried to the roof and almost intact. Readers of *Rotunda* were first informed of the Dakhleh Oasis Project five years ago (volume 13, no. 2). Since that time, the survey has been completed and the history of the region is now being compiled. As our Dakhleh archaeology team prepares to depart for the first season of full-scale excavation, it is time to bring *Rotunda* readers up to date.

The earliest remains yet found in Dakhleh date back fifty thousand years to a time when all of the eastern Sahara had abundant water and plenty of game. They belonged to the Acheulean hunters of the Old Stone Age who followed the herds in and around the Dakhleh area but made no attempt to settle.

Some seven thousand years ago Neolithic people began to appear in the oasis area. At this time the environment would have been much like that of East Africa today, with seasonal rainfall and large herds of animals. The oasis would have been a gathering place for people and animals during the drier times of the year. Bones of elephant, antelope, zebra, ostrich, and other large animals have been found and several petroglyphs of giraffe have been recorded in and around the east end of the oasis.

Between the fourth and third millennia B.C., the climate gradually became more and more arid and the grasslands disappeared. Human beings were forced to remain in the oasis, one of the few remaining sources of water, and to develop a sedentary way of life based on crude farming. As the surrounding area became increasingly hostile, the oasis dwellers were isolated. Not all outside contact was lost, however, for the oasis remained an important water source for

## The Precarious Existence of a Desert Oasis

Alan Hollett



Petroglyphs of giraffe

The town of Smint contains both Roman temples and Christian churches. Many ruined buildings still stand above ground.







A. J. MILLS

This *saggia*, near Mût, is used to raise water from a well. *Saggias* were introduced by the Romans but are still in use today. Constructed of ceramic pots tied to a wooden wheel, the *saggias* are driven by oxen or donkeys.

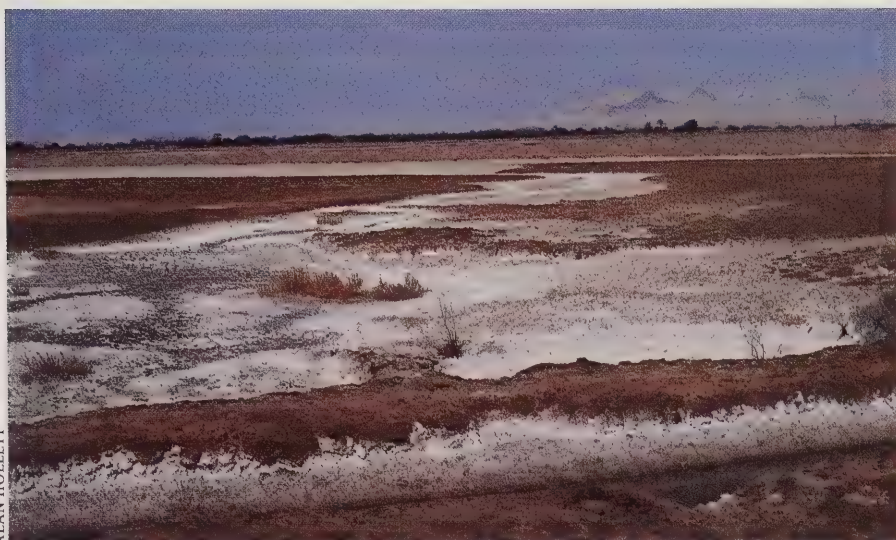
caravans travelling to the west and south. Throughout Egyptian history the oases were famous for their agricultural produce, and Theban tomb scenes show products such as fruit, baskets, and sandals coming from the Dakhleh area.

Even though the oasis remained important, the population never seems to have been very large. So far studies show that the only major settlement of the Pharaonic period, Ain Aseel, was built during the reign of Pepi II (c. 2269–2175 B.C.). The town and its adjacent *mastaba* tombs of “oasis governors” are being excavated by a French team. Why a town of this size should be built at that time is not yet known, but it may have provided a safe alternative settlement to the region of political unrest and economic turmoil in the Nile Valley. Several other towns and cemeteries scattered throughout the oasis also date from this time. The stele from Dakhleh dating from the XXII (950–730 B.C.) and XXV (729–656 B.C.) Dynasties tell us that Libyans were present and that the oasis was well organized with a priesthood and irrigation rights.

It is possible that throughout the dynastic period (3000–500 B.C.) the main reason for the sparsity of the population was people’s inability to utilize the water resources. The Egyptians would have brought their technology from the Nile Valley where irrigation relied on water flowing down by gravity from a source higher than the land to be cultivated. As the water table decreased, the springs on higher ground gradually dried up with the result that less and less land could be cultivated.

Later, when the Romans arrived, they were able to install more sophisticated hydraulic technology which permitted them to reach deeper water sources. They also introduced the Persian water wheel (*saggia*), which made it possible to raise the water to higher ground and to utilize greater areas of land. Through





These salt pans, located beside the road east of Mût, are created by the rapid evaporation of irrigation water. This land is now useless for agriculture.

the discovery of many farm buildings, ancient field systems, and aqueducts dating to the 1st century A.D., we know that a systematic agricultural development scheme was introduced. At the same time a number of large towns such as Amheida and Smint, small villages, and farmsteads also appeared. Important cemeteries were found near the towns. It is quite possible that the population was greater at this point than at any other period during the history of the oasis, perhaps even greater than at present. Most of the surface finds and archaeological evidence date from this period. This prosperity was relatively shortlived, however, and after about four hundred years, the population started to decline.

This decline may have had two causes. It is possible that the deeper wells used by the Romans began to dry up and that rapid evaporation, from over-irrigation of the land, caused the soil to become too saline. It seems, also, that large sand dunes began to cover large parts of the oasis, as they still do today.

With today's modern drilling methods it is possible to tap aquifers that were beyond the reach of earlier inhabitants. This, however, may be only a short-term solution, for unless it can be determined that the water is a renewable resource, today's inhabitants may be repeating the mistake of the Romans. In a few years the water supply may start to diminish and the oasis to shrink. As it is, there are very few naturally flowing wells left, and without mechanical drilling the oasis would not be able to support its current population. Can modern man learn from the Romans' error, or are we doomed to make the same mistakes again? Modern man must learn to understand and deal with potential drought situations in order to help in Ethiopia and other sub-Saharan areas today.

Of the many sites, there are several that are outstanding. In 1979, a team surveying the site of Amheida discovered a domed room with its interior walls painted with scenes of Greek mythology and dating to about the 4th century A.D. As the team was only surveying, the room was reburied with clean sand to preserve it, and it awaits more complete excavation and study in the future. Within the town of Smint both Roman temples and Christian churches have been found, and some quite impressive tombs still stand above ground. Throughout the oasis a number of mud-brick temples and churches have been recorded. Of some, only the foundations remain, while others still have walls standing up to four or more metres high.

When Herbert Winlock of the Metropolitan Museum of Art in New York visited the Dakhleh Oasis in 1909, he added a footnote to his journal entry: "Drovetti and Cailliaud mentioned the foundations of a ruined temple—which we did not visit—2.5 km NW of Teneideh at 'Ain Birbeyeh' which takes its name from the ruin. Rohlfs, p.301 saw this ruin but calls it a Roman castle rather than a temple."

Imagine the excitement when preliminary surface examination of this site in 1983 proved that, rather than foundations, what was showing on the surface



was the roof. It is indeed a temple, and it is buried at the west end in a sand dune on which tamarisk bushes now grow. This sand dune could have buried the temple in as short a time as fifty years after its abandonment; if so, the structure is probably well preserved. Preliminary excavations have revealed two staircases to the roof and several decorated areas. Unfortunately the quality of the stone is poor, and extensive conservation will be required as the sand is removed. Complete excavation and conservation of this site will take at least five years. The temple probably dates from about the 3rd century A.D. and is slightly larger than a similar temple at Deir el Haggar at the other end of the oasis.

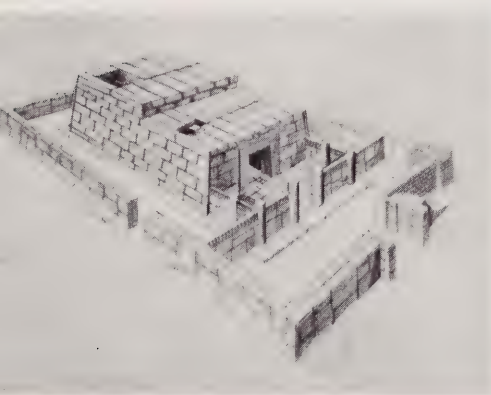
*Right:* Egyptian workers are replacing the lintel over the door of the tomb of Kitines.

*Below left:* An artist's impression of the buried temple of Ain Birbeyeh. This impression is based partly on the temple of Deir El Haggar located at the opposite end of the oasis.

*Below right:* The mound burying the temple of Ain Birbeyeh. The tops of the temple walls have been exposed by the archaeological team.



ALAN HOLLETT



ALAN HOLLETT



In a small village called Beshendi, near the Ain Birbeyeh temple, there are a number of stone tombs. One of these, which belonged to a man named Kitines, has been restored and cleaned by the Dakhleh Oasis Project. In January and February 1985, a latex rubber mould of the entire decorated sanctuary was made so that a facsimile can be produced for the new Egyptian galleries at the ROM.

Having successfully completed the survey, the Dakhleh Oasis Project is looking forward to several years' work excavating the many sites. It would be impossible to excavate them all in one lifetime but work on the most important ones should be under way in the near future. These include the three large Roman sites at Smint, Mût, and Amheida, a large cemetery near Balat and the temple at Ain Birbeyeh.

*Alan Hollett is a technician in the Egyptian Dept., ROM, and has been involved with the Dakhleh Oasis Project since 1978. Major funding for this project has come from the Social Sciences and Humanities Research Council of Canada.*

Sudan, the largest country in Africa, includes a variety of environments and peoples. Its northernmost part, a hot and generally barren land, is called Nubia. In the past Nubia extended north along the Nile Valley to Aswan in Egypt, but since the erection of the High Dam, a large part of the valley has been submerged under man-made Lake Nubia. Further upstream the course of the Nile is interrupted by granite outcrops commonly known as the cataracts. The region between the Third and the Fourth Cataract is called the Dongola Reach and here lie the roots of Nubia's many civilizations.

The long and complex history of this area (see chart) and its unique location at the head of the S-shaped bend of the Nile, where the river returns to its normal northward course, make it an ideal place to look for evidence of influence and contact between the grain cultivators of the Nile Valley and the pastoral people of present-day Darfur, Kordofan, and Chad. Nubia, linking the Mediterranean World and sub-Saharan Africa, is called "a corridor to Africa", and the Dongola Reach may be viewed as a gateway at the end of this corridor.

It seems surprising that until very recently no serious archaeological work was undertaken in such an important region. In 1964 a Polish mission began excavating one major site, and in 1976 Dr Nicholas Millet of the Royal Ontario Museum conducted a preliminary inspection tour of the area between the towns of El Khandaq and Ed Debba. He then secured the necessary exploration permit for the Museum. In October 1984, I led a group of graduate students and archaeologists on the first full-scale campaign. We returned there in January 1985 for another two months of surveying, and we hope to be able to continue our field work for years to come.

An archaeological journey to Dongola requires more than a short trip to a friendly travel agent to purchase air tickets to Khartoum. First we studied ancient documents pertaining to the region, read the accounts of early travellers, and carefully examined maps, air photographs, and satellite pictures. Thus, well before our departure to the Sudan we knew what we were looking for, where we should look for it, and why. We also selected the village of El Ghaddar as the most suitable place for setting up our camp.

El Ghaddar is located at the southern edge of the Letti Basin (Khor Letti), an area of extensive cultivation not only along the river but also farther east along what seems to be an extinct Nile channel. This can be particularly well seen on a LANDSAT photo showing a big sandy "island" encompassed by two wide green belts of arable lands. Nowadays the Letti Basin is an important agricultural centre and we had some clues that this might also have been the case in the past, for not far from El Ghaddar lay the ruins of Old Dongola.

From the end of the 6th century A.D. until the Arab conquest in the 14th century, Old Dongola was the capital of Makuria, one of the Christian kingdoms of Nubia. It was described by various Byzantine and Arab writers and visited in the 19th and 20th centuries by numerous European, Canadian, and American travellers, and since 1964 it has been excavated by the Polish expedition. Perhaps it was this special attention paid to the ruins of Old Dongola that distracted scholars and travellers alike from what was around. And there was plenty!

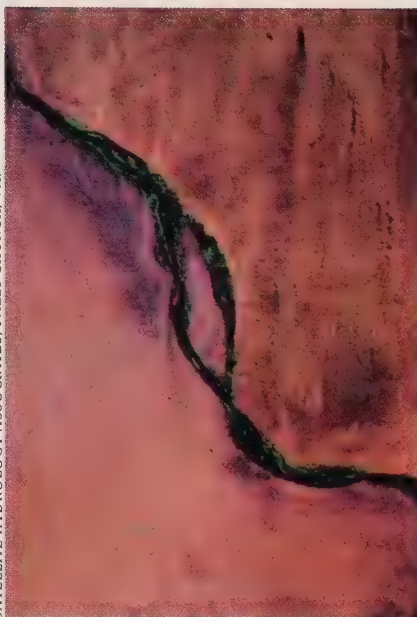
# Archaeology Between the Cataracts

Krzysztof A. Grzyski

CHRONOLOGY OF UPPER NUBIAN CULTURES	
?	c. 2200 B.C.
KERMA CULTURE	1550 B.C.
EGYPTIAN RULE	1080 B.C.
?	c. 800 B.C.
NAPATAN-MEROITIC KINGDOM	c. A.D. 350
TANGASI CULTURE (?)	A.D. 570
KINGDOM OF MAKURIA	A.D. 1317
ARAB RULE	PRESENT

LINDA CRAWLEY





The area in which the ROM is conducting its archaeological survey can be seen in this LANDSAT image of the Nile Valley between Ed Debba and El Khandaq. The Nile, which can be seen in the centre of the image, is bordered by green belts of cultivated land. Further away from the Nile, a region of sandy desert is located to the left, and a region of rocky desert to the right.

*Below left:* A field shot of Christian potsherds found at one of the Letti Basin sites.

*Below right:* One of several Nubian *tumuli* located in the desert sands.

In order to locate ancient remains of the Dongola Reach we had to criss-cross the whole area in a systematic manner. During the two seasons' work we traversed a substantial part of our concession using various means of transportation: Land-Rovers, donkeys, camels. Even though we found camels to be particularly suitable for our type of work it was walking that turned out to be the most reliable method of locating sites. By March 1985 we had accumulated a list of seventy-eight sites of various dimensions and periods: small Stone-Age camps, small and large cemeteries, and—in many ways the most interesting of all—a series of large mounds extending along the river.

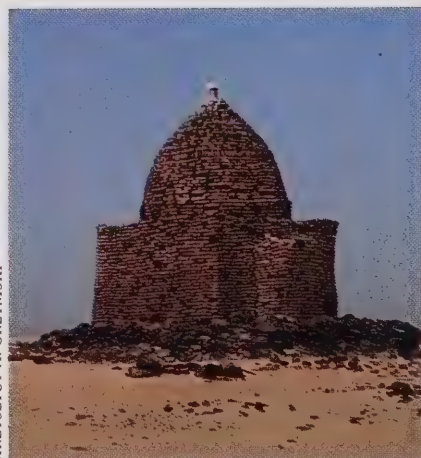
These artificial mounds, known in the Nile Valley as *koms* and elsewhere in the Near East as *tells*, usually cover the ruins of ancient mud-brick buildings. For the most part they are the remains of ancient towns and villages, but in Nubia one also finds complete churches, often with their mural paintings intact, fully covered by the sand. What is hidden in the *koms* of Dongola Reach? Nobody knows for sure and we must await future excavations to answer this question. Clues from the surface finds suggest that most of these mounds cover Christian remains, and a smaller number of Meroitic remains.

One site, containing different material going back perhaps even to the Kerma period (2200–1550 B.C.) was found farther away from the river, at the foot of the imposing mountain called Jebel Ghaddar. It was not a single *koma* but rather a vast cemetery of over a hundred large, circular grave mounds of the type archaeologists describe as *tumuli*. Some of the *tumuli* were ten to fifteen metres in diameter and stood three to four metres high. Their external appearance suggested that they were all broken into long ago, but the excavation of one such *tumulus* provided us with enough material to date it between the 4th and 6th centuries A.D. This was quite a surprise, for on the basis of surface finds we were expecting a four-thousand-year-old Kerma burial instead. Such constant challenges to our preconceived ideas were perhaps one of the most enjoyable aspects of our work. And nothing pleased us more than discovering something out of place, something extraordinary.

Perhaps the most enigmatic discovery was made in Khor Letti on the site we have numbered ROM 35. There, among low mounds covered with a scatter of Christian potsherds and red bricks, lay a large granite block bearing a hieroglyphic inscription written in four vertical columns. This piece of grey granite was first seen by the eminent American Egyptologist James Breasted in December 1906, but had since passed unnoticed. The text really confounds us. It is almost certainly written in Meroitic hieroglyphs, but it might also contain an admixture of Egyptian signs. Although the Meroitic language remains unintelligible to us, we can at least recognize words. However, in the case of the Khor







Letti Stone we can hardly identify any familiar words known from other texts. It is one of the frustrations of survey work that there is only a limited amount of time to devote to any one site, for our main duty is to keep moving and recording new sites.

Our progress northwards from El Ghaddar led us eventually to a place called Urukutti (Nubian for "Royal Mound"). Despite its royal name it is now a rather modest site, largely destroyed by modern occupations. It was saved from total destruction by the Sudanese Directorate of Antiquities, which successfully reclaimed much of the site. We were drawn to this place not only because of its name, but also because of the good water available nearby. This is where we set up our second camp.

Like El Ghaddar twenty kilometres to the south, Urukutti (which also goes by such totally different names as Amentego Post Office and Sheikh Ismail) is surrounded by numerous archaeological sites. Right on the porch of our expedition house we found a prehistoric chert scraper lying among the Meroitic and Christian potsherds. There is also reason to suspect the presence of Pharaonic remains in the nearby village of Amentego Kasse.

In the end, however, Urukutti, like most other sites in the area overwhelmed us with an overabundance of Christian pottery fragments. Prevalence of these medieval remains was not totally unexpected, as further north French and Sudanese archaeologists had noticed a similar pattern in the distribution of archaeological material, but we felt a bit disappointed in not finding more remains from non-Christian settlements. Nevertheless, we have collected enough artifacts to suggest a long period of human occupation in this part of the Dongola Reach perhaps dating as far back as 15000 years.

On the other end of the time range are Islamic monuments, many of them dating as recently as the 19th century A.D. In fact one of the most unusual groups of ancient remains belongs to the Islamic period. These are the so-called *gubbas*—beehive-shaped structures that dot the Nubian landscape. The *gubbas* are tombs of local holy men, but they have also become the objects of a popular cult and are venerated by the modern population of Nubia. Nubians pay much respect not only to these sacred places and the people of the Islamic age, but also to the more ancient remains.

On many occasions the present-day inhabitants of the region expressed curiosity about their distant past by visiting our camp to see our finds. Teachers and peasants alike would come not only to see what we had found but also to show us objects that they found in their fields, or to provide us with information about prospective sites. Some of this information proved valuable; in other cases, however, it led nowhere, as on one occasion when we spent a whole day in the Nubian desert searching for a royal cartouche said to be inscribed somewhere on the rock. The nomad who originally provided us with the information was so upset with our bad luck that he promised to spend the whole summer looking for the lost inscription. By the time this article appears we shall know if he has succeeded.

*Above left:* A large Muslim cemetery near Old Dongola. The beehive-shaped structures (*gubbas*) are the tombs of the local holy men.

*Above right:* The *gubba* at Haj Magid represents one of the best-preserved Islamic sites in the region.

*Dr Krzysztof Grzyski is assistant curator of the Egyptian Dept., ROM. He joined the Museum in 1984 and is currently director of the Dongola Reach Project. Major funding for this project has come from the Social Sciences and Humanities Research Council of Canada.*







# MYSTERIOUS INSECTS OF THE SEA

*They are among the most beautiful and abundant shrimps in the sea, but have you ever seen an amphipod?*

Edward L. Bousfield

TWO fishermen in a small, sea-coast village in Nova Scotia were puzzled. They leaned against a boat and discussed the peculiar thing that had happened to one of them that morning when he raised an empty lobster pot from the ocean.

The older man looked at the other, puffed on his pipe, and said: "It's mighty mysterious. The bait that I put in that trap yesterday was nothing but a bag of bones this morning." A frown crossed his weathered countenance.

The answer to this mystery lies in the activities of small marine invertebrate scavengers, the ubiquitous crustaceans called amphipod shrimps, or simply amphipods. They probably date from the early Mesozoic period, the heyday of the dinosaurs, some two hundred million years ago. Those gigantic reptiles died out suddenly about sixty-five million years ago but amphipods have continued to proliferate in many different environments.

The greatest variety of large decapod crustaceans (lobsters, crabs, shrimps) are found in tropical marine environments, but most species of the smaller amphipods live in temperate to cold marine regions, in both fresh and brackish waters. Ironically, these creatures, which are virtually unknown to most people, are among the most copious and the most varied of all shrimp to be found from the shallows of the intertidal zone to the deepest ocean trenches. They are the most common shrimps in underground waters, especially in brackish, oxygen-deficient



Mottled pleustid (*Pleustes*). As their name suggests, amphipods are distinguished by having two kinds of legs. In this photograph we can see the first four pairs of thoracic (upper trunk) legs directed forwards, with the claws curved backwards, and the last three pairs of legs directed backwards, with the claws curved forwards. This is an ideal arrangement for clinging and burrowing, but inefficient for walking.



Spiny-handed gammarid (*Odontogammarus* sp.). This exceptionally large amphipod, measuring 75 mm in length, was found at a depth of approximately 1115 metres in Lake Baikal, Siberia.



*Previous page:* Saddle-back pleustid (*Parapleustes oculatus*). The round, purple, pigmented area, located between the two yellow patches on the side of the head, is an eye. Unlike the eyes of true shrimps and lobsters, the amphipods' eyes are not on movable stalks.

marine habitats. They are also the most diversified order of shrimps in the fresh waters of the world. Nearly three hundred species, including some of the world's most bizarre types, are found in Lake Baikal, Siberia, the world's largest and deepest lake. The average life span of an amphipod is one to two years. Some species, especially those of the deep sea and of fresh-water caves where food is limited and infrequent, may live more than fifteen years.

Most of the historical and scientific study of amphipods in Canadian waters has taken place during the past thirty years. Before 1950, fewer than two hundred Canadian species had been identified, collections were small, and specific information was scarce. Since then, more than a half million specimens have been added to Canadian museum collections. From these we have identified nearly one thousand species and learned much about these unusual animals and their contribution to the ecology of lakes, streams, and oceans.

When the Nova Scotia fisherman lowered his trap containing bait, the amphipods, attracted to the scene by "odours" detected by sensory hairs on their





Above: Variegated Pacific hyalid (*Parallorchestes variegatus*). Like other amphipods this animal is a "naked" shrimp, lacking the shell of true shrimps and lobsters. It propels itself with three pairs of swimming legs (pleopods) which can be seen beneath the first three segments of the abdomen, and by thrusting its stiff three-piece tail.



Left: Spiny-skeleton shrimp (*Caprella spinosissima*). This heavily armoured (spined) amphipod clearly shows the mouthparts concentrated efficiently, and as in insects, in a buccal mass beneath the head. Eggs develop in the roundish brood pouch beneath the thorax. The two pairs of gills radiate in front of and behind the pouch. The young will hatch as miniature adults known as immatures or juveniles.

antennae, quickly devoured the bait. The fishermen above could not clearly see the swift-moving animals as they "skeletonized" the bait within minutes. In another example of carnivorous behaviour, scuba divers complain about being bitten on exposed parts of their faces and hands by amphipods.

It would be unfair, however, to imply that amphipods are only a nuisance. By converting organic plant and detrital material into animal protein, they provide food items for most fish at some stage of their life history. Amphipods are a basic food for the commercial fishes of the Great Lakes. They are an intrinsic part of the aquatic food energy cycle.

The next time you take an early-morning stroll along a sandy seashore, you will probably find it fairly clean because of the night-time scavenging of amphipods known as beach fleas and sandhoppers. Through their "clean-up" activities, piles of dead kelp left stranded by receding tides rapidly disappear. Certain species of amphipods are among the numerous scavenger invertebrates that help to clean up or to reduce materials dumped at sites used for offshore waste disposal.

Marine amphipods, as a group, tolerate a wide range of physical, chemical, and biological environments. Most individual species, however, appear to be environmental specialists. Each species tolerates only very limited variations in any of its living conditions (temperature, oxygenation, velocity of the water







*"The reality of dance is its truth to our inner life. Therein lies its power to move and communicate experience. The reality of dance can be brought into focus – that is into the realm of human values – by simple, direct, objective means."*

*– Martha Graham*



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Giant sandhopper (*Megalorchestia californiana*). The sandhopper burrows in sand at the high-tide level and feeds on wrack, mainly at night. The males have long, orange antennae that they use for detecting and holding the females during mating.

*Dr Edward L. Bousfield, F.R.S.C. is senior scientist, National Museum of Natural Sciences, Ottawa, and research associate, ROM. Dr Bousfield has conducted studies on amphipods for thirty-five years and is a recent recipient of the Outstanding Achievement Award of the Canadian civil service.*

current, turbidity, and salinity). The surf-exposed shores of the Canadian Atlantic, Pacific, and Arctic coastal regions provide a wide variety of suitable marine habitats for a correspondingly wide range of specialized amphipod species.

In today's practical world, the amphipod may offer one of the best and simplest means of indicating the levels of pollution in the aquatic environment. Some species have such precise life requirements that they are sensitive to even minute levels of pollutants. At the University of Washington, biologists are currently carrying out studies on sediment-burrowing amphipods of Puget Sound, a region heavily subject to environmental pollution. Several amphipod species may soon be used to determine levels of heavy metal ions, PCBs, domestic sewage, and other man-made pollutants that can be tolerated without serious damage to marine benthic (bottom-living) animal and plant communities.

A "species list" of amphipods will eventually be used to determine fairly precisely the degree of purity of the environment both at the time of sampling and in the immediate past. Such information will be of considerable economic value to manufacturers of forest products, as well as to mining and fishing industries, who are under the gun to ensure that their operations do not destroy the amenity of pristine recreational areas.

Scientists speculate that twenty-five thousand species of amphipods could be discovered world-wide; only about six thousand are known to date. New species are being discovered at a rate of nearly three hundred per year, and this rate is increasing as more students become involved with this fascinating group.

We must work to keep our planet as our ancestors found it, and as we all wish to leave it. The amphipod, that minute and busy animal, the mysterious "insect of the sea", is one of the constant workers that help us to keep the waters and environment clean and free from pollution and suitable for human habitation.

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# HEROES AND COURTIERS

## Persian Stories in Tile

Ingeborg Luschey-Schmeisser

*Are the events displayed on Persian tile spandrels from mythology or from real life?*

**I**SFAHAN: NISF-I-JAHAN—Isfahan is half the world. These glorious words describe the 17th-century splendour of Isfahan, the imperial capital of Iran. Its central focus, the royal residence, comprised several magnificent palaces and pavilions, set in fragrant gardens and decorated inside and out with rich, evocative paintings and tiles. Once inside the residence, guests would find themselves in shady gardens, where delicately built kiosks were surrounded by streams and water basins. As they approached the buildings, they could admire in detail the numerous scenes of the hunt and other royal pleasures displayed on the tile spandrels gracing the many archways. When the French chevalier J. Chardin visited Iran in the mid-17th century and

witnessed such a scene, he was inspired to write: "Even if they are only card castles, they are more charming and pleasant than our most luxurious palaces."

Two pairs of tile spandrels from such a setting are now mounted over archways in the Islamic gallery of the ROM. A dragon hunt is portrayed on the first pair of spandrels and a royal outdoor banquet is seen on the second pair. In their presence, and with a little imagination, the Museum visitor can transport himself back to the grandeur of 17th-century Iran.

The ancient Iranian legends preserved in the *Shah Nameh* (Book of Kings) recount the hunting skills and courage of the Persian king (Shah) Bahram Gur, who ruled in the 5th century A.D. After the poet Firdawsi

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Tile spandrels showing picnic scene; Islamic gallery, ROM. A favourite royal pastime was to venture out into the countryside for feasting, musical entertainment, and hunting. While the figures are depicted in the style of Persian painting of the 17th century, the prince's palace, tucked away in the corner, shows the use of perspective, which was borrowed from examples of European art and brought to Isfahan by visitors from France, Portugal, Germany, England, and Holland.



Tile spandrels showing dragon fight; Islamic gallery, ROM. Only about half of the tiles are original, but fortunately missing tiles from each side could be copied by creating the mirror images of the opposite panels.



BRIAN BOYLE

*Opposite page:*

*Top:* Tile fragment of a dragon fight, formerly in the collection of the Kunstgewerbe-Museum, Berlin.

*Middle:* Tile spandrels showing royal picnic; collection of the Hermitage Museum, Leningrad. These tiles were probably made from the same cartoon as were those in the ROM. The picnic scene is almost completely preserved; only the inner connecting tiles are missing. The ROM and Hermitage spandrels, although very similar, differ in detail and use of colour. The major difference can be seen in the clothing. In the Hermitage spandrels, the prince and his attendants, with the exception of the musicians, wear laced robes rather than the simpler robes of the ROM figures. Also, the birds flying back to the endangered nest are preserved in the Hermitage spandrels.

*Bottom:* Tile fragment of a dragon fight, commonly known as the *Blue Horseman*; private collection, Tübingen, Germany. This artifact is of exceptional artistic quality, but unfortunately only the figure of the riding lancer (probably Bahram Gur) and the jaws and wing tips of the dragon are preserved. The lacing of the lancer's robe emphasizes the knightly character of the figure. This type of laced garment appears to be of Georgian (Caucasian) origin, for already in the 17th century, J. Chardin refers to it as *caba à la Georgienne*.

versified the epic of Bahram Gur around A.D. 1000, it became the most popular subject for illustrated books in Islamic Iran. It is probably this king who leads the battle against the dragons.

The battle is set in a very decorative landscape. Three riders, Bahram Gur and two heroic companions, gallop across the battlefield. The king charges with lance and pennant in hand; his companions, dressed in knight's armour, fight with bow and arrow. Victory is won over the first dragon, but the second survives in spite of the two arrows that pierce its neck and back. Bahram Gur administers the *coup de grâce* by thrusting his lance through the creature's jaw. A frightened man, standing behind a tree, witnesses these terrifying acts.

Several tile paintings in other museum collections offer further evidence that the popularity of the dragon theme was not limited to miniature painting. A fragment, which was in the Kunstgewerbe-Museum, Berlin, but disappeared after World War II, was similar to the ROM panels, as are spandrels in the Staatliches Museum of East Berlin and a superb fragment in a private collection in Tübingen, Germany.

The second pair of ROM spandrels portrays another popular subject for miniature painting—picnickers, possibly a prince and his entourage. Set against a background of lustrous yellow, this scene of courtly pleasure takes place in the meadows beyond the palace walls. The composition of individual groups is bound together by a motif of bottles and bowls of fruit. The prince is being served by his page who pours a drink from a glass or ceramic long-necked bottle. Two musicians are seated in the lower corner of each spandrel, a violin player (*rabab*) and a tambourine player (*da'ira*). Two attendants look on with astonishment as a bowman hunts birds and a boy steals eggs from a nest. In the background stands the prince's palace, a small complex of buildings fronted by a striped terrace and surrounded by cypress trees. This theme is repeated on a pair of spandrels in the Hermitage, Leningrad.

It is fairly certain that the ROM panels came from a 17th-century building in Isfahan. The Hasht Behesht (Eight Paradises), a garden pavilion built about 1670 and recently restored, is one of the few royal buildings of this period still standing. On it are preserved forty-two pairs of tile spandrels, resembling those in the ROM collection. The cartoons for its tiles are thought to have been designed in the workshop of the famous painter Mu'in. Although the similarity in style suggests that the cartoons for the ROM panels may also have been designed





I. LUSCHEY-SCHMEISSER



I. LUSCHEY-SCHMEISSER



I. LUSCHEY-SCHMEISSER

by Mu'in, the themes are different from those of the Hasht Behesht. Since the quality of workmanship also differs, the tiles were probably produced in different ateliers. However, proof that the ROM tiles do come from Isfahan was found in two sources.

A document in the British Museum suggests that a set of tiles, technically similar to the ROM tiles, was salvaged from the royal stables of Isfahan. Another panel, also stylistically and technically close to the ROM tiles, even shows a scene in the Royal Square (Maydan-i Shah), which was located near the stables,





Tile spandrel showing entertainment of the Shah in the Royal Square of Isfahan; collection of the Linden-Museum Stuttgart. Various activities and contests are depicted—wrestling, butting goats, and dagger fights. The Shah sits in the corner behind the two goal posts used for polo matches, which still stand in the Royal Square.

and sports that took place there. This panel is now in the Linden-Museum Stuttgart.

The technique for painting the tiles is referred to in Persian as *haft-rangi* seven-colour ware (yellow, turquoise, cobalt blue, light green, ochre, brown, and white). Bright colours are first separated from each other by an oily substance painted on the bare tile. This substance, which remains long enough during firing for the coloured glazes to fuse before it burns away, performs the same function as the metal walls in *cloisonné* enamel. The process leaves a neat mosaic of pure colour areas with a crispness that works well when viewed from a distance. The colourful glossy tiles contrast effectively with the buff brick walls of the building. In bright sunlight, the yellow shines like gold and the flat tile panels appear in very low relief. A splendid lustre extends overall. Each tile spandrel is framed by a border of a colour that contrasts with its background, and we can assume that the ROM panels also had such borders which are presently simulated in wood.

The two pairs of Toronto spandrels are beautiful examples of the art of Isfahan during the last third of the 17th century, and their subjects represent two of the most important themes of the period. They also provide information about 17th-century battle dress, weapons, and equipment, as well as about courtly costume, musical instruments and performance, and vessels for eating and drinking.





The spandrels add an important dimension to the Museum's Islamic collection by portraying in monumental proportions popular themes that are usually found in miniature paintings by contemporary and earlier artists. The dragon scene may well have been inspired by a miniature painting, but what about the picnickers? These may be literary characters but they may also be portraits of persons from the Safavid court. They may be gathered here to celebrate some event from contemporary life in the 17th century or they may come from the same world as the dragon, a literary tradition of Iran. We may never know whether it is the Safavid Shah watching games in the new Royal Square (Maydan-i Shah) or the entertainment of a legendary king, as recounted in the *Shah Nameh*. Perhaps even the 17th-century visitor could sense this ambiguity.

It may be easy to see that figures are legendary when they are depicted performing supernatural tasks, but what tells us that a legendary figure, performing an ordinary task, is indeed, a legendary figure? And one must never forget that the ruling Shah was thought to possess heroic attributes. Even when the stories come from the ancient past, the setting, costume, and spirit belong to 17th-century Persia.

RENATA HOLOD

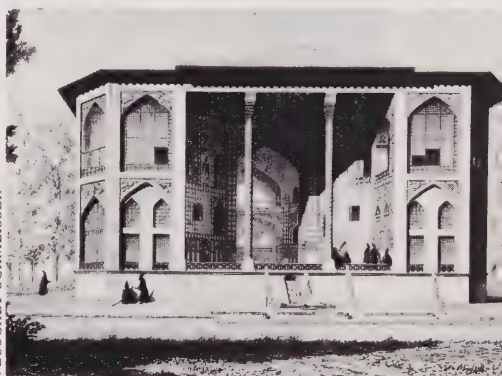


Above: Tile spandrels from the Hasht Behesht pavilion showing falcons, trained for the hunt.

Left: Miniature painting of picnic scene, attributed to Mir Musavvir, c. 1525; collection of the Metropolitan Museum of Art. Gift of Alexander Smith Cochran, 1915. The prince sits cross-legged like the courtiers in the picnic tile spandrels.

Below: The Hasht Behesht pavilion of Isfahan, drawn by P. Coste, 1854. The pavilion was built around 1670, and the original tilework, comprising forty-two antithetical pairs of arched panels, is almost completely preserved.

I. LUSCHEY-SCHMEISSER

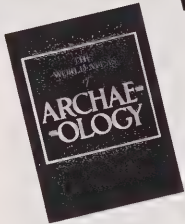


Dr Ingeborg Lushey-Schmeisser published a major study on the Hasht Behesht tiles in 1978 with the *Istituto Italiano per il Medio ed Estremo Oriente* and has written numerous articles on the series of tiles presented in the preceding article. *Heroes and Courtiers: Persian Stories in Tiles* was translated from German by Carey Gustavson-Gaube.



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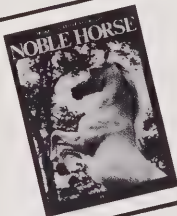
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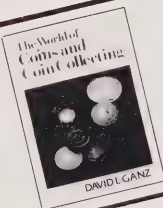
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# LOUIS RIEL

## Turmoil in the Nineteenth Century

*16 November 1985 marks a century since the execution of Louis Riel. Twentieth-century perceptions of this controversial figure vary from champion of native rights to fanatical manipulator of a threatened people. It may not be as well known that 19th-century views varied as widely.*

Claude Rocan

*Group of Rebel Leaders, from left to right: Beardy, Big Bear, Louis Riel, White Cap, and Gabriel Dumont. Sketch by the Special Artist of the Canadian Pictorial and Illustrated War News. Canadiana Dept., ROM.*



FEW figures in Canadian history have received more attention than Louis Riel. A seemingly endless list of authors have attempted to capture the "essence" of the man. Not only Canadian writers, but also Britons, Frenchmen, Americans, Germans, Italians, and others have tried to define Riel's message to the world. Yet the Metis leader remains an enigma. Over the years, interpretations have varied greatly. Some observers have cast him in the role of leader of a group of barbaric and semi-barbaric individuals making a last-gasp attempt to resist the inexorable march of civilization. Others have seen him as a leader in the campaign to establish French-language rights in the Canadian North-West. Still others have depicted him as an individual who dared to protest Western Canada's "quasi-colonial" relationship with Central Canada. Whereas one school of thought has declared Riel utterly insane, another denies this and finds him perfectly rational.

Furthermore, there is no indication that interest in the Metis leader is abating. The past decade or so has witnessed the development of a hitherto unexplored dimension of Riel: his role as a religious/mystical figure. This interpretation has come out of the systematic study of those writings by Riel which earlier observers had often dismissed as the rantings of a madman. Some have even tried to present him as a kind of left-wing guerilla leader.

With the publication this year of *The Collected Writings of Louis Riel / Les Ecrits complets de Louis Riel* by the University of Alberta Press, Riel's thoughts will be accessible to a much wider public than ever before. In all probability, this will stimulate new ways of defining what it was he wanted to accomplish in his short but eventful life.

Many interpretations have been developed by looking back to the events of the Red River Resistance in 1869-70 and the North-West Rebellion in 1885. But how was Riel perceived by his French Canadian and English contemporaries? Strangely, in view of the great controversy that has surrounded his characterization in later years, this ques-

BRIAN BOYLE





BRIAN BOYLE

tion is often answered a little glibly. In many works, it is dealt with offhandedly in a few sentences or paragraphs. We are told that Riel was loved by French Canadians because they saw him as one of their own, and hated by English Canadians because he was a French-speaking Roman Catholic. Because English Canadians formed the majority in Canada and because they were more powerful politically, their thirst for Riel's blood was satisfied on 16 November 1885 with the execution of the Metis leader.

This response is a little too simple. What is so fascinating about Riel is that he was on the cutting edge of so many issues that divided Canadians of his era and which, to a greater or lesser extent, continue to divide Canadians today. The divisions that come most immediately to mind are those between French and English Canadians, Catholics and Protestants, aboriginal and non-aboriginal people, East and West. One would expect that the responses he elicited from his contemporaries would also be diverse.

Although there are no public opinion surveys to indicate what Louis Riel represented to English Canadians in the 19th century, the newspapers of the day are an invaluable source of information. They documented the thoughts of a well-educated and articulate segment of the population, one whose very business it was to disseminate views and provide information on a wide range of issues. In the journalistic style of the period, the dividing line between these two functions was blurred at the best of times. This blurring may have been augmented by the role that almost all major papers also played as organs of either the Conservative or Liberal party.

A careful reading of the major newspapers reveals the presence of two themes that characterized their treatment of Riel and of the actions of the Metis in the North-West. The first of these revolves around the 19th-century imperi-

*The Capture of Batoche. Colour lithograph. Grip Printing and Publishing Company, Toronto; from sketches by the Special Artist of the Canadian Pictorial and Illustrated War News. Canadiana Dept., ROM.*



## EXECUTION OF RIEL.

The Rebel Chief Meets His  
Doom Stoically.

SOLEMN SCENE ON THE SCAFFOLD.

He Makes No Speech, and Dies  
Without a Struggle.

ONLY A VERY FEW PERSONS PRESENT.

The Body to be Removed to St.  
Boniface for Burial.

NO EXTRAORDINARY EXCITEMENT

The Demand for Simple Justice Fully  
Satisfied.

*From Our Own Correspondent.*

REGINA, N. W. T., Nov. 16.—The execution of Louis Riel took place at 8 o'clock this morning, and the half-breed leader and organizer of two rebellions has passed to the ultimate tribunal. He met his fate bravely, and displayed more fortitude than had been thought possible. Fortunately he abstained from speech-making, and confined himself entirely, on the advice of Father André, who has been his constant companion throughout, to spiritual matters. Riel never slept after receiving intelligence that the execution would take place this morning, and throughout the night was constant in his devotions. At seven o'clock he had a light supper, and at five in the morning mass was celebrated, followed two hours later by the administration of the last sacrament. Riel towards the last almost entirely dropped his new religious idiosyncracies and decided to die a devout Catholic.

### HIS LAST DEVOTIONS.

The hour fixed for the execution was eight o'clock, but it was fifteen minutes past that hour before those who had passes from the sheriff were admitted to the guard-room. Here was found the prisoner kneeling on the floor of an upper room, from which he was to step to the gallows. It was a sad scene. Around him were gathered numbers of mounted police, Sheriff Chapleau, Deputy-Sheriff Gibson, and a few others. The room was illuminated by a small window covered with a rime of frost through which the sun, now risen but a few hours, shot a few weak rays. Riel now knelt beside the open window, through which the gallows could be seen, and prayed incessantly for fully half an hour. Williams and André con-



alist distinction between "civilization" and "barbarism". English Canadians referred to the indigenous people as the "inferior races." By the latter half of the 19th century, English Canadians were fairly accustomed to incidents of the "inferior races" rising up against the newcomers. They may even have felt that it was quite natural that the aboriginal people should react in this way, since they were facing the destruction of their way of life.

The English majority also believed that the efforts of the aboriginal people were doomed to failure. Moreover, they believed that that was precisely how it should be. The advance of the white man stood for the march of "progress" and "enlightenment", and it was an article of faith that these forces would vanquish all that stood in their way.

It is in this context that one must understand a good deal of English Canada's response to Louis Riel's people, the Metis, as a race of "semi-savages", again to use English Canadian terminology. The Metis were often compared to children, because, like children, they were completely "ignorant of the ways of the civilized world".

Riel himself was not seen as a primitive man; his education at the Sulpician Fathers' Collège de Montréal precluded that. But as a political leader he had successfully managed to tap the feelings of fear, insecurity, and resentment of a population that was being overrun by white civilization. Because of this, Riel was often seen as cynically manipulating his ignorant and trusting fellow-Metis—his "dupes" in the words of many newspapers—for his own personal aggrandizement.

The conflict between "barbarism" and "civilization" was a theme that pervaded the treatment of the English-language press in Canada of both Riel crises—the Red River Resistance in 1869–70 and the North-West Rebellion in 1885. Unfortunately, this theme has not been given much prominence in the very considerable body of literature that has been written about Riel and his activities. Too much of this material has emphasized, instead, the linguistic and religious side of the controversy. These factors were undoubtedly significant, perhaps especially so to the general public. We know of the many "indignation meetings" held in Ontario in which blatantly anti-French and anti-Catholic sentiments were expressed. These feelings were also expressed in print in such publications as the *Orange Sentinel*. For the major newspapers, however, these considerations were secondary. Riel was primarily seen as one who, for whatever reason, had managed to focus the frustration and the anger of a doomed people.

The second major theme that appeared consistently in English-Canadian newspapers involved the preservation of law and order. Among English Cana-



dians, the rule of law was spoken of in quasi-religious terms. For example, an excerpt from the *Daily Telegraph* of Toronto, 17 November 1869, states: "The basis of all government, human and divine, is order. We take possession of the North-West to establish first and before all things else order—order such as we enjoy here—protection to life, protection to property."

Given this attitude, it is not surprising that the responses to the troubles in the North-West were so vehement. As soon as reports began reaching Central Canada in late 1869 that obstacles had arisen to the orderly transfer of Rupert's Land from the Hudson's Bay Company to the Government of Canada, English papers of both political parties united in demanding that order be restored in the North-West at all costs. They could not bear to see the violation of the British Crown's authority, above all, by a group of people they considered semi-barbaric. English Canadians felt that the Metis must be taught to respect British institutions and the rule of law, and that failure to act promptly would probably lead to the repetition of such acts in the future.

Despite a certain confusion over the jurisdiction of Rupert's Land during the latter part of 1869 and the first half of 1870, English Canadians seemed shocked that Louis Riel would assume an authority he did not legally possess. The words most commonly used to refer to the Metis leader during this period were "usurper" and "dictator". There was a connection between the two in the English-Canadian mind. Since Riel's authority had no basis in law, what limits could be placed on its exercise?

A great deal of anger over Thomas Scott's killing (4 March 1870) at the hands of a Metis firing squad revolved around the law and order issue. It was not so much that French-Catholic Riel had ordered the killing of English-Protestant Scott, although this undoubtedly helped to fuel the already burning passions in Ontario. Rather the central issue, at least as far as the newspapers were concerned, was that Riel had killed a British subject without any formal authority to do so. "Who gives Riel his authority?" raged the *Ottawa Times* on 1 April 1870. "Had he by virtue of the vote of a public meeting any legal right to take the life of a fellow creature who differed from him in political opinion? This is the point to be considered."

## A REBEL'S DOOM.

Riel Pays the Last Penalty for his Crimes.

HIS LAST MOMENTS ON EARTH.

Ascends the Scaffold Without a Faltering Step.

HE DIES ALMOST WITHOUT A STRUGGLE.

*Special to The Mail.*

REGINA, Nov. 16.—The morning opened bright and clear although snow had fallen during the night. At 8 o'clock the execution party ascended the rickety ladder of the barracks, and after reaching the up stairs department, proceeded along the left to the far end, where was found Louis Riel kneeling near the door leading to the scaffold with Pere Andre and Father McWilliams reciting prayers for the dying. Dr. Jukes stood close by, also Sheriff Chapleau, the tall form of Deputy Sheriff Gibson being the door. The fatal noose was visible, dangling in the near distance. Around stood a guard of police. At 8.05 Pere Andre administered the last rites.

*The Volunteers' Return.* Colour lithograph, Grip Printing and Publishing Company, Toronto. Canadiana Dept., ROM.



THE EVENING MAIL, TORONTO, 16 NOVEMBER 1885



# RIEL'S DEATH

Sentence of the Law Carried  
Out Yesterday.

THE SCENE IN THE GAOL.

How the Condemned Man Prepared  
for His Doom.

HE EXHIBITS RESIGNATION.

His Last Day One of Almost Continu-  
ous Prayer.

RESOLUTE BUT HUMBLE BEARING.

With Calm Serenity He Surrenders  
Himself to the Executioner.

FEELING THROUGHOUT THE COUNTRY.

Langevin, Caron, and Chapleau Burned  
in Effigy in Quebec.

FRENCH CANADIAN PRESS COMMENTS.

(Special Despatch to THE GLOBE.)

REGINA, N.W.T., Nov. 16.—Louis David Riel is at rest at last. His long and eventful career ended this morning, and all his offenses against mankind were expiated when he died at the hands of the common hangman. He had only a few hours' notice that his doom had been finally determined upon, and those hours were ALL SPENT IN PRAYER.

Unavailing efforts were made yesterday afternoon and evening by all the reporters staying here to have an interview with him, but he refused to talk with anyone after he had been informed that his execution would take place today. My interview with him was the only one.

The North-West Rebellion was an even more blatant violation of the law than the Red River Resistance. There was no longer any question about whose jurisdiction the area was under; Canada's authority over the North-West Territories was indisputable. Since 1873, the North-West Mounted Police had been present to maintain law and order and, by implication, to assert Canadian sovereignty. When English Canadians heard, in 1885, that there had been a second set of disturbances, this one far bloodier than the Red River Resistance, they resolved to accomplish two major goals. The first and more immediate was to crush the rebellion itself with all possible dispatch.

The second goal, which caused by far the greater controversy, was to see the leaders of the rebellion brought to justice. Although a certain stereotype exists of English Canadians gleefully rubbing their collective hands in anticipation of Riel's execution, this sentiment is nowhere expressed in the leading newspapers. In fact, the major newspapers of both parties exhibited considerable reserve in the months leading up to the execution. The Conservative papers kept largely silent as the conviction was appealed to the Court of Queen's Bench of Manitoba and the Judicial Committee of the Privy Council in Great Britain, saying that it was improper to comment on a case that was still before the courts. Throughout these months, although the Liberal papers favoured the execution, they did not mount any large-scale campaign. Perhaps this was a squeamish reaction to the demand to take a man's life. As the London *Advertiser* put it on 11 September 1885: "It may be pardonable to do many things with the view of obtaining clemency which it would be inexcusable to employ to secure the punishment." In any event, by the time 16 November arrived, several Liberal papers were calling for a commutation of the sentence on the grounds that they had received firm evidence showing Riel to be insane.

What the newspapers in English Canada were saying was that the law should be applied in Riel's case as it would in the case of any other individual who had been convicted of the same offence. When they heard appeals on his behalf from Quebec, many newspapers in English Canada, particularly the Conservative, concluded that French Canadians wanted the law applied differently in Riel's case because he was a French-speaking Catholic. It was this perceived threat of preferential treatment for Riel that angered many English Canadians and led them to express themselves in ill-considered, hurtful words that have never been either forgotten or forgiven. The Toronto *Daily Mail*, itself guilty of some of the most vicious verbal excesses, made this point on 20 November 1885, four days after Riel's execution, when it wrote: "It was the organized attempt to brow-beat justice and to overawe the Executive which roused the people of Ontario to insist that the law should take its course."

And what of French Canadians? What did Riel represent to them? On this point, Quebec opinion was perhaps more divided than many would expect. This is not to suggest that there was a major rift in Quebec between rival pro- and anti-Riel factions. During the debate over his execution, virtually every major sector of Quebec society had rallied to his defence. Nevertheless, there were some important differences in the way Riel was seen in Quebec and therefore what he signified to French-Canadian society.

Most French Canadians saw Riel and the Metis as victims of persecution at the hands of the English Protestant majority. They felt that the Red River Resistance and the North-West Rebellion resulted from English Canadian attempts to rid the North-West of the Metis because they were French-speaking and Roman Catholic. Pushed to exasperation, the Metis had no choice but to defend themselves in the only way at their disposal. For French Canadians who sympathized with the action taken by the Metis, the desire to punish Riel was the culmination of the English-Canadian persecution campaign directed against a vulnerable French-Catholic population. They rejected the arguments about the preservation of law and order as mere window-dressing. To them, Riel's execution represented a major victory in the English-Canadian campaign against French-speaking Catholics, not just in the West, but everywhere in Canada.

Yet to some French Canadians, Riel was more than just a pathetic victim of English-Protestant persecution. This was particularly true during the Red River



Resistance and the controversy over whether Louis Riel and the leaders of the Resistance should be granted an amnesty for their activities during these events, a controversy which dragged on until 1875. The Ultramontanes—a highly religious and nationalistic movement with which Riel had close ties—in particular espoused the belief that Riel's cause and the French-Canadian cause were one and the same. To them, perhaps more than to those who saw Riel solely as a victim, the Metis were members of the greater French-Canadian family, just like Quebeckers and Acadians. They saw Riel as a man who had put his personal interests aside for the good of the French-Canadian people.

Quebec Liberals, at times, also went beyond the Riel-as-victim perception. During the Red River Resistance, Liberal newspapers represented Riel and his fellow Metis as radical democrats fighting for the same rights of self-government that other Canadians enjoyed in Confederation. Their motives may have been rooted in a sincere conviction that Riel and his followers were fighting a just cause worthy of their support. The Liberal Party saw itself as the only political party in Quebec that represented democratic values. Following Riel's execution some editorials, written in Quebec Liberal newspapers, depicted the Metis leader in heroic terms.

On the other hand, this support may only have been a convenient way of embarrassing the Quebec Conservatives by showing that the "Bleus" (as they were called) were willing to tolerate unjust actions taken against Francophone Roman Catholics. A particularly damning piece of evidence to support this conclusion is a reference to the Quebec Liberals' role in the amnesty debate contained in a letter written by Wilfrid Laurier in 1874 to a political colleague in Ontario. In this letter, Laurier states:

We in the province of Quebec feel rather anxious about this amnesty question. It is not that we have any sympathy for those whom this amnesty is intended to cover. They are not now, nor ever shall be, whatever we may do for them, our friends or allies. But when we were fighting the old enemy, making a tool of everything at our hand, we took this Riel question and kindled the enthusiasm of the people for him and his friends, in order to damage the old Administration, who were doing nothing to their relief.

It remains true, however, that the overwhelming tendency in Quebec was to portray the Metis leader as a rather pathetic figure, a creature of circumstances who had long ago lost his mental capacities.

Whatever the Liberal motives, there can be no doubt that they played very effectively on Riel as a symbol for French Canadians. The Parti National, led by Honoré Mercier and comprised primarily of Quebec Liberals, defeated the ruling Conservatives in the provincial elections of 1887. At the federal level, the Liberal handling of the Riel situation contributed to the crumbling of Conservative support in Quebec and the rise of Laurier's political fortunes. Moreover, the memory of Louis Riel seemed to affect the electoral fortunes of the federal Conservatives in Quebec for almost a century following the execution on 16 November 1885.

The message that Quebec Liberals successfully managed to drive home to the Quebec voting public was that Quebec Conservatives could not be trusted to defend French-Canadian interests in a time of crisis. This seems somewhat ironic, since Riel always considered himself a Conservative, and ran for election in the riding of Provencher under that party's banner. Even while in prison in Regina, awaiting his trial for high treason, Riel wrote to Prime Minister Macdonald suggesting a way to extricate both Macdonald and himself from their mutual dilemmas, which would also have the desired result of seriously embarrassing the Liberals.

What, then, did Louis Riel represent to his contemporaries? There is no simple answer to this. Riel obviously meant different things to different people, depending on which language they spoke, where they lived, what political party they adhered to, and perhaps where they were positioned in the social structure. It may be said that in the same way attempts to stereotype Riel consistently miss the mark, so stereotypes of what Riel meant to his contemporaries fail to reflect the diversity of opinions and values that were expressed during that turbulent period in Canadian history.

## THE FELON AT REGINA.

Riel to be Hanged at 10 O'clock,  
Toronto Time.

NOW HE RECEIVED THE DREAD NEWS.

He Retracts His Errors and Dies in the  
Bosom of the Church.

THE DECISION OF THE DOMINION EXECUTIVE.

Appeals for Clemency Rejected after the  
Fullest Consideration.

THE LAW MUST TAKE ITS COURSE.

From Our Own Correspondent.

REGINA, N. W. T., Nov. 15.—A special train with chief of Dominion Police Sherwood on board arrived here at 7.20 this evening. Chief Sherwood has the order for Riel's execution to-morrow morning in his possession. The town is in a fever of excitement. Father André proceeds to the barracks immediately, to administer the last rites of the Church to Riel. Sheriff Chapleau received the order this evening. The execution will take place about 8 a.m., or 10 o'clock Toronto time.

HOW RIEL RECEIVED THE NEWS.

Riel received the formal intelligence at nine o'clock to-night in his cell in the guard-room of the Mounted Police barracks, three miles west of this city. The intelligence was conveyed to him in person by High Sheriff Chapleau. The scene was in many respects remarkable. The famous rebel's cell is immediately adjacent to the guard-room of the troops doing night patrol duty, fully fifty of whom occupied the room. Through the iron gate in front of the cell was seen an armed sentinel on duty, and outside the building a cordon of armed men were pacing their beats.

HIS GREETING TO THE SHERIFF.

The iron gate was thrown open on the  
broach of High Sheriff Chapleau  
commander of sb

Dr Claude Rocan completed his Ph.D. at York University on Changing Canadian Perceptions of Louis Riel's Significance. He has been the coordinator of the Riel Project at the University of Alberta and at present is working for the Government of Saskatchewan.





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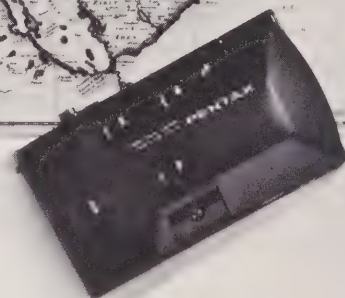
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## Speaking of Castles . . .

*A. R. Jamieson, teacher in Education Services, ROM*

When some people talk about knights, they talk about the daily events that centred around castles. Castles were built to protect the lord's (castle-owner's) men, to help them to secure and protect an area of land, and to represent the seat of power to the local people. Like all buildings castles changed in their style and structure over the years. These changes were often needed because of new developments in warfare and weapons, and to accommodate the daily needs of the castle residents.

The word "castle" comes from the Old French word *castel* which in turn comes from the Latin word *castellum*. The Normans were the first group in Europe after the Romans to perfect the regular use of fortifications. One of the best countries in which to trace the history of castle-building and changes in castle construction is Great Britain, beginning with the year A.D. 1066 when the Normans conquered England.

The first type of castle built by the Normans was called "motte and bailey". To construct such a castle, a circular ditch was dug and the earth removed from the ditch was piled



Windsor Castle

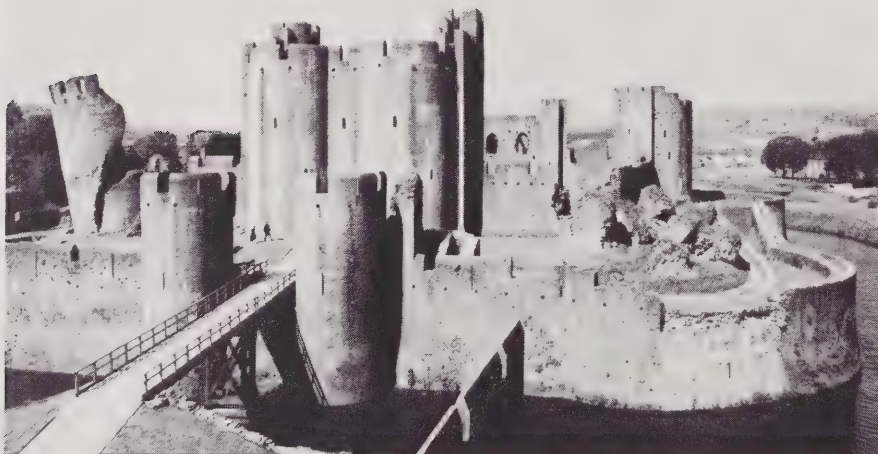
on the round piece of ground that it enclosed. The resulting mound of dirt was the "motte". A two- to three-storey wooden building, encircled by a wooden stockade, was constructed on top of the motte. Beyond the original ditch, an outer circular ditch and wooden stockade enclosed a defensive area known as the "bailey". Additional baileys bordered by ditches and stockades could be constructed to increase the defences. Because motte and bailey castles could be built so quickly, one

may refer to them as "instant castles".

An important development in castle construction was using stone instead of wood so that the castles could not be burned. This happened between the years A.D. 1080 and 1189 in most places. The stone walls, which replaced the wooden stockades, were called curtain walls. The royal castle at Windsor, England is one of the best-known castles that still has a stone round tower on its motte and is completely enclosed by its curtain wall. Various additions and reconstructions at Windsor Castle make it possible for visitors to trace many of the developments in castle-building that have taken place over nearly one thousand years.

The great years of castle-building in England and Wales were from approximately A.D. 1189 to 1377. These years encompass the reigns of the kings Richard I (the Lion-hearted), John, Henry III, and the first three Edwards. The castles built during this period of English history are the ones we usually picture in our minds when we think of castles, knights, chivalry, fair ladies, and tournaments.

As siege warfare techniques were improved and cannon became more



Caerphilly Castle, north of Cardiff, Wales



powerful, castles became less effective. Castle inhabitants also wanted greater comfort as well as maximum protection from enemies. Castles became fortified houses. Sometimes water moats replaced dry ditches, and moats were widened to keep the enemies' cannon as far away as possible from curtain walls.

Eventually the two main functions of fortified houses or castles were separated. Great houses were built for comfort and splendour. Fortresses and forts were constructed for military purposes.

Wealthy nobles began to build large houses. The architecture of these great houses often resembled castles and they were sometimes referred to as "castles" or "palaces". These structures were really just large comfortable houses and were certainly not built to provide protection against attack. Even today large houses can be built in the style of a castle. In Toronto there is Casa Loma (which means house-on-the-hill), a large house which reflects the past styles of castles but which has all the modern conveniences of the twentieth century.



Casa Loma

Canadian fortresses include the Citadel in Quebec City and Louisbourg on Cape Breton Island. Fort Henry in Kingston, Fort York in Toronto, and Fort George in Niagara-on-the-Lake are a few of the many fortifications that have been restored. Forts used dry ditches and wooden stockades much like those used in the motte and bailey type of castles of nine hundred years ago.

When you begin your study of castles, fortresses, and forts you can use the resources at your school and public libraries. Perhaps you will also be able to visit a Canadian castle, fortress, or fort to explore these exciting structures from our past.

## Canadian Children's Annual Number 11

Potlach Publications Limited  
160 pp. \$9.95 (paper)

*Reviewed by A. R. Jamieson,  
teacher in Education Services, ROM*

The *Canadian Children's Annual* is a collection of short stories, articles, and poems written and illustrated in full-colour by Canadians. The eleventh edition begins with a celebration of Canada in Space. It is written by Robin Rivers, a graduate of the creative writing workshop at the University of Victoria, who was assisted in her research by the National Research Council. Satellites, astronauts, and science fiction are included in this entertaining feature. Other articles and short stories cover topics ranging from Australia to ancient Egypt and from Canada's Group of Seven painters to a boy who paints his toes to look like faces. The *Annual* is a most exciting and varied collection of work for children.



BILL ROBERTSON



## Stone Lion Carvings

I think the artist carved these decorative stone figures to guard the body within the tomb. The archway they are carved on must have been an entrance to the tomb.

The artist wanted to make the lions look ferocious so evil spirits would stay away. To make them more frightening they are part lion, part dragon.

I am drawn to these carvings again and again because of their form and beauty. It must have taken a long time to carve them for there is so much detail. To carve with such precision in such hard material must require a life-long training. The artist also had only simple tools with which to work.

By now some of the detail is fading but most of it is still visible. The two carvings appear identical and

must have been made by the same person; the match is indeed incredible. I am sure that few people can carve like this today, but it was a very popular activity in China at the time of the creation of these guards.

Although there are some holes, chips, and worn spots, the splendour of the creatures is still present.

*Allegra Fadelle  
Age: 13*





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## THE GROWING COLLECTIONS

A special exhibition of some of the many costumes, fabrics, and accessories acquired by the Textile Department since 1979 is currently on view at the ROM. Acquisitions include gifts of personal possessions and donations of contemporary fashion wear by well-known fashion designers and clothing manufacturers. Other items were purchased with cash donations. The Textile Department continues to document and preserve fabrics and clothing, from the common to the luxurious, and from a great variety of cultures. As a result our collection is both distinctive and amongst the largest in the world. A few of the highlights of the exhibition are illustrated here.

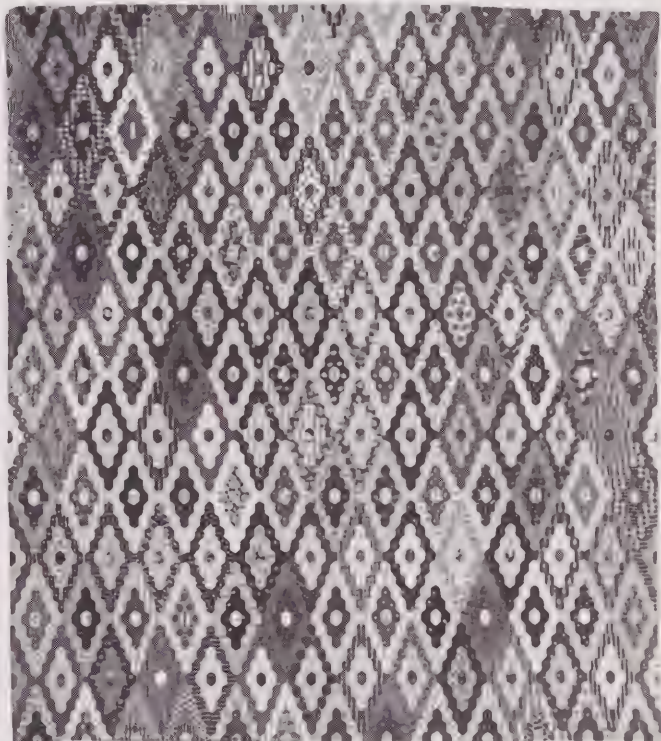
LOUISE MACKIE  
MARY HOLFORD

A 19th-century English patchwork quilt was made with remnants of printed cotton dress material. The designs in the cotton scraps which date from 1800 to 1840, show the variety of delicate patterns that were fashionable for women's wear. Gift of Mrs C. Jane DeVitt.



This spectacular red velvet evening dress was designed by David and Elizabeth Emanuel of London. The elaborately constructed gown, encrusted with artificial pearls, coloured jewels, and gold lace, is complemented by a matching head circlet and pouched bag. Reminiscent of a noblewoman's dress of the Italian Renaissance, it is a striking example of the Emanuels' rich, theatrical style. These designers received international attention when they created the wedding dress of H.R.H. the Princess of Wales in 1981. Gift of David and Elizabeth Emanuel.

This detail of a colourful Mexican silk shawl displays an intricate pattern of animals and leaves woven in *ikat*. It was woven in the state of Zacatecas on 16 September 1831. Gift of Mr & Mrs W. K. Newcomb.



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The draped gold and black felt toque by Rose Valois c. 1948 (left) resembles a man's *chaperon* or hood turban of the early 15th century. Valois followed in the path of the renowned milliner Caroline Reboux, credited with introducing the cloche hat in the 1920s. Both milliners were noted for their skill in custom draping. This technique, rarely seen in women's millinery prior to the 20th century, involved moulding wet felt on to a "block head" and pulling or draping it into the desired shape to dry. Gift of Mr Harvey Sobel. Right: The dramatic hat by Balenciaga, (c. 1960 to 1965) is made of black chicken feathers, curled and clipped to give a delicate furry texture. They are applied to a stiff net form. Throughout the 19th and early 20th centuries, this method was traditionally used by milliners who also used wire, buckram, or straw for the same effect.



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*Left:* An Indonesian batik that was worn wrapped around the waist is an example of fashionable Asian dress from the north coast of Java. The colourful pattern of European-inspired floral bouquets was signed by Tan Tong Swie, the Chinese designer and batik manufacturer, c. 1930. Gift of Mrs Ian D. Townley.

*Right:* This little boy's coat of the early 18th century was tailored in the style of men's coats. It is fashioned from rich Italian silk brocade, woven c. 1715 to 1720, in a late "bizarre" pattern. The fabric may have been used for a woman's dress before it was used to make the boy's jacket. Gift of the Textile Endowment Fund Committee.



Western fascination with the East is evident in the pattern of an English crewel-embroidered panel dating from the first half of the 18th century. Tartars in traditional dress appear outside a round felt and reed house called a yurt, while others, standing in front of mountains, bring home the dinner. This addition enhances an already impressive collection of crewelwork. Anonymous gift.



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*Edited by  
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## The Malcove Collection

EDITED BY  
SHEILA D. CAMPBELL



**University of Toronto Press**



## THE GROWING COLLECTIONS



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*Above left:* This canoeing costume is an early example of sportswear for women. The khaki cotton shirt and knee-breeches were worn by the donor's mother, Mrs Jean MacMahon, while on her honeymoon at Limberlost, Ontario in 1923. Gift of Mrs A. D. Small.

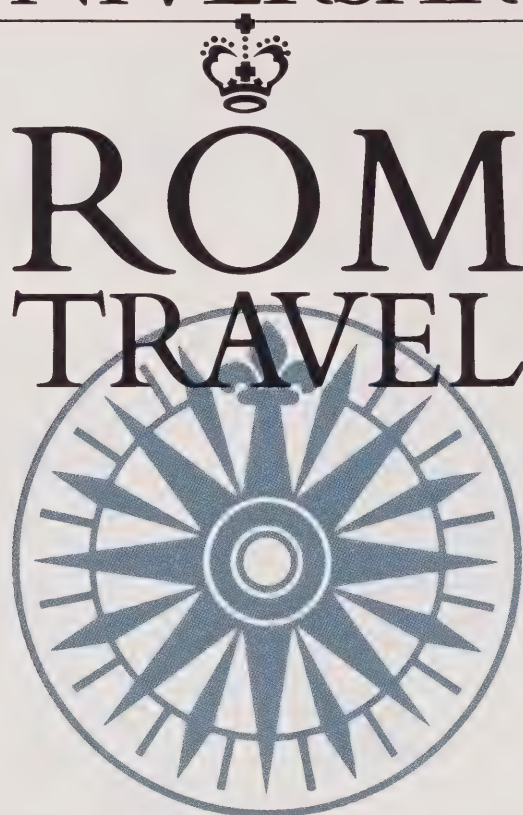
*Above right:* This smoking jacket (c. 1900) consists of over three hundred Havana cigar box ribbons carefully pieced in diagonal stripes. It is an example of the "coatmakers' system" by which a garment was drafted and made by one tailor. Mr Wesley Allan, a Toronto tailor, made this jacket as a young man, probably as his masterpiece. Gift of his daughter, Mrs Thelma Rice.

*Left:* This Hudson's Bay Company blanket coat was designed by Alfred Sung. It is one of a special collection of blanket coats that The Bay commissioned from leading Canadian designers. The simple cut of this garment emphasizes the company's red, green, yellow, and black blanket stripes, and a discreet gold braid trimming adds a touch of femininity to the coat. Gift of The Bay.



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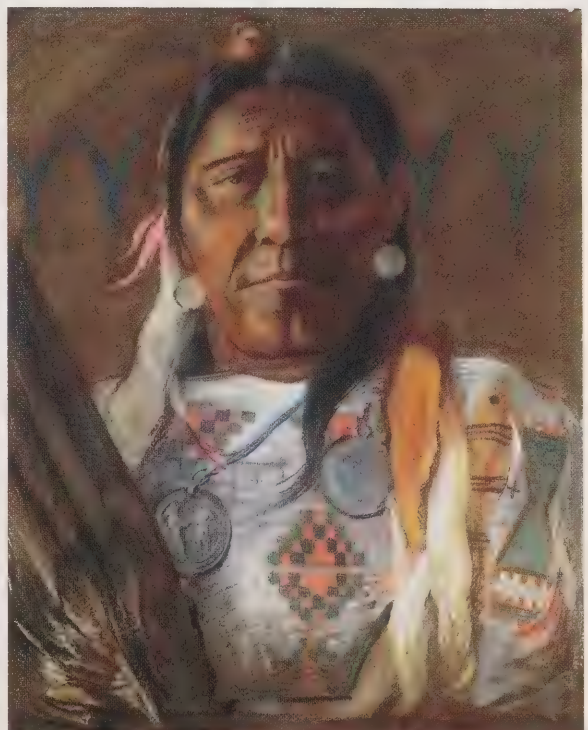
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142 pp. \$24.95 (cloth)

Reviewed by K. Corey Keeble, associate curator in the European Department, ROM

*Keep 'em Rolling* was published for Toronto's sesquicentennial, but it would be a mistake to think that its appeal is limited to that event. Ron Watson has given us a book that will remain interesting for many years to come. In part it is a document of the history of the Canadian National Railways' roundhouse and shops at the foot of Spadina Avenue in Toronto. But it is also Ron Watson's tribute to his father, Harry Watson (1901–1977), who worked for the CNR after his arrival in Toronto from England in 1923 until his retirement in 1966.

Harry Watson was obviously more than just a railroad employee; he was a man who had a genuine affection for all aspects of railroading. He also had a keen eye and a good sense of composition. From his first days with the railway, Watson began to build up a photographic record of the roundhouse, the yards, the locomotives that were sent there for maintenance work, and the people who worked on them.

Watson's photographs of locomotives, ranging from aging yard engines to powerful sleek passenger

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## BOOK REVIEWS

trains, cover the whole transition from steam to diesel. He left more than 750 prints and negatives, scrupulously edited by Ron Watson to present a pictorial record that equally informs and charms the reader. This most satisfying book is utterly devoid of pretension with a format and aims that are simple and straightforward.

As early as 1901 Frank Lloyd Wright had extolled the locomotive and other "engines of industry" in terms usually reserved for architecture, sculpture, and painting. To look at Harry Watson's photographs of locomotives in the Spadina yards is to be reminded over and over again that the creations of the Machine Age have their own aesthetic power.

At the same time, in Harry Watson's photographs there is a reminder of the transitory nature of all earthly things. His earlier photographs, taken in an age when steam and coal were the prime movers of the wheels of industry, show the Pacifics, Mikados, Hudsons, Mountains, and Northerns that ruled the rails. By the late 1950s, as the shift from steam to diesel was accelerated, these same monarchs of the rails were banished from their domain and relegated to remote sidings; their one exit was to the scrapyard. In some of Watson's photographs of the late 1950s, obsolete steam locomotives are shown on sidings, their boilers cold and dead, their rusting surfaces covered with a crust of snow. It is a pleasure to note that some of the steam locomotives which Harry Watson knew and loved so well were spared the ignominy of reduction by the scrapyard cutting torch.

*Keep 'em Rolling* is an enjoyable book because of its engaging text and scores of black and white reproductions. It is an impressive personal record of a fascinating aspect of Canadian history, and all who are captivated by the romance of transportation will feel a sense of gratitude to Harry Watson for recording it, and to his son Ron Watson for bringing it eloquently and lovingly to the public eye.

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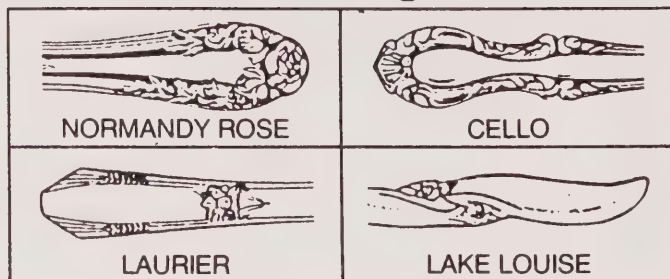
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## FOSSILS AND THE HISTORY OF LIFE

GEORGE GAYLORD SIMPSON

**Fossils and the History of Life**

George Gaylord Simpson  
Scientific American Library  
W. H. Freeman and Co.  
Distributed in Canada by Oxford  
University Press  
239 pp. \$39.25 (cloth)

*Reviewed by Kevin Seymour, curatorial  
assistant in the Department of Vertebrate  
Palaeontology, ROM*

Most general books on palaeontology, as any child knows, are replete with colourful pictures and information on dinosaurs. Occasionally one finds the opposite extreme, a rather technical account that is systematically arranged and full of descriptions of a bewildering array of fossil organisms with unpronounceable names. The general reader is confronted with texts that are either too simplistic or overflowing with scientific terminology, and is left with many commonly asked questions unanswered. *Fossils and the History of Life* is a book with a refreshing generalist approach that should go a long way toward bridging this gap.

This book gives a broad palaeontological overview of the history of life. Instead of just describing extinct animals, Simpson demonstrates the kind of information that can and cannot be derived from the study of fossils and what use fossils are, and have been, to mankind. After an introductory chapter on the science of palaeontology, Simpson vividly describes the physical characteristics

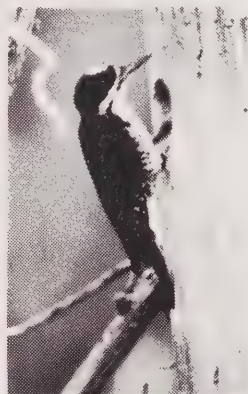
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and daily existence of many animals that are known to most of us only through fossilized remains. He also describes the variety of fossils that occur according to geological age and geographic locality. Concepts of continental drift, geological time, biogeography, classification, and biological adaptation are carefully explained, as well as the crucial role that palaeontology has played in the development of each of these concepts. More technical chapters dealing with the many features of evolution, show the amazing diversity of information fossils can provide. These chapters establish the solid evidence upon which much of evolutionary theory rests. Parts of this book could be used by students of palaeontology; since it is primarily written for the educated layperson or scientists in fields other than palaeontology, it assumes no previous technical knowledge.

The information contained in this volume is both accurately and objectively presented. However, the personal touch is not entirely excluded. There are anecdotes about various people, theories, and events that make this volume both entertaining and readable. Overall, the author succeeds in giving a balanced account of various controversies, including the question of whether or not dinosaurs were "warm-blooded".

The book is richly and appropriately illustrated with high-quality photographs and drawings. One feature that I particularly appreciate is the annotated guide to further reading. It is up-to-date and very selective. Simpson has carefully chosen summary works that are broad in scope, comprehensible, and accurate. In recent times, no one person has contributed more to the development and maturation of palaeontology and evolutionary biology than G. G. Simpson. In this book, his outstanding contributions are made available to the general reader.

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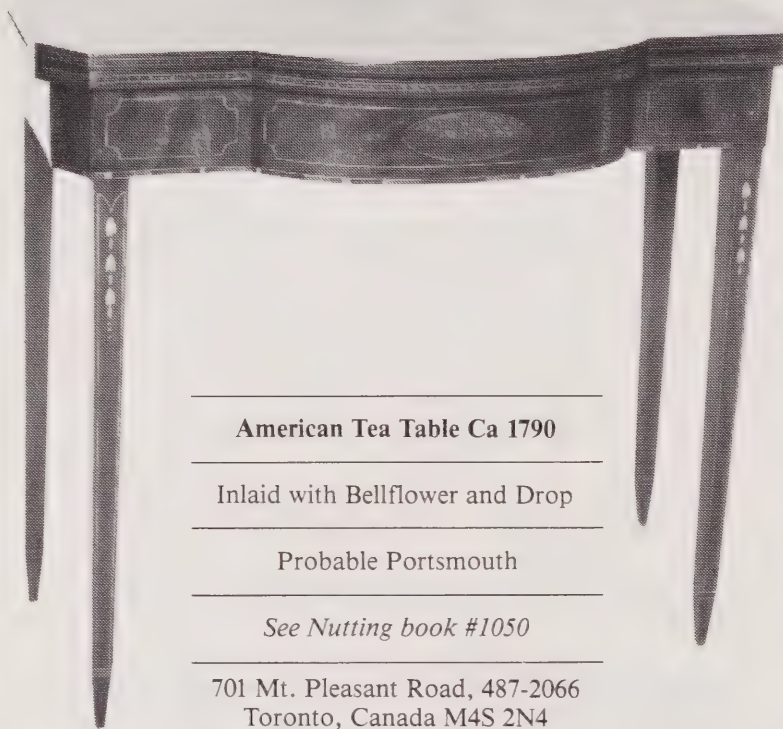
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## BOOK REVIEWS



### **The Sound of the Drum: The Sacred Art of the Anishnabe**

Mary E. (Beth) Southcott  
Boston Mills Press, 1984  
228 pp. \$24.95 (cloth)

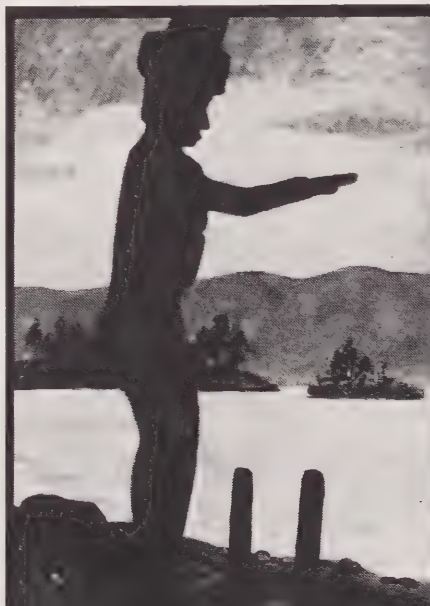
*Reviewed by Barry J. Martin.*

*Mr Martin teaches a course on Indian and Inuit art for the School of Continuing Studies, University of Toronto.*

*The Sound of the Drum* is one of the first comprehensive studies on modern Anishnabe or Ojibwe/Cree art, as it is more commonly known. This art has become very popular, both nationally and internationally, through the oeuvre of such artists as Norval Morrisseau, Daphne Odjig, Carl Ray, and Benjamin Chee Chee, among others. The book complements an excellent earlier study *Norval Morrisseau and the Emergence of the Image Makers*, by Elizabeth McLuhan and Tom Hill.

*The Sound of the Drum* describes the art and the aspirations of the artists in a way that can be easily understood by both the *cognoscenti* and the general public. Southcott, an artist with a background in fine art and anthropology, was uniquely qualified to accomplish this task. The art historical approach to style, iconography, and aesthetics is interwoven with the information gleaned from anthropological field work and personal interviews.

The artists are divided among four groups based on style, history, and geography: the pioneers, the northwestern Ontario style, the Manitoulin Island style, and the variations. There is an introductory chapter on each of the four groups in which biographical information is



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## BOOK REVIEWS

presented on twenty-seven of the more than seventy artists practising today. Oddly enough, the data on the well-known artists is at times weak and overly subjective. Presentation style of responses to common interview questions tends to make tiresome reading. Nevertheless, this compilation of basic facts and opinions is valuable and nowhere else available for the lesser-known artists.

The noteworthy chapters are *An Analysis of the Style of Anishnabe Art* and *Iconography of Anishnabe Art*. The former discusses the relationship of the formal elements of the modern art to Midewiwin sacred birch-bark scrolls and Ojibwe religious traditions. The latter chapter demonstrates how the iconography of the art is a reflection of Ojibwe shamanism, Midewiwin beliefs and values, and to a lesser degree, Christianity. The depth of cultural meaning is brought to life by the explanation of the various icons so often seen in the art. The Ojibwe rituals, which also form an integral iconic role in many of the paintings, are dramatically described. The chapter on aesthetics and legends is unfortunately less complete, and the final chapter *The Artists Have the Last Word* could have been severely edited down to the artists' crucial comments.

Southcott is to be commended for attempting to let the native point of view clearly come across, for this book deals with how the natives perceive their lives and art; it also provides an objective study of their art. For this reason *The Sound of the Drum* breaks new ground. Future research may relate artistic style, sources, and icons to more groups or individual artists.

For the specialist or novice collector, Beth Southcott has presented us with a work of devotion to the artists and to their art. It does justice to the depth and integrity of Anishnabe culture and to the artists who are currently communicating their cultural and spiritual renewal, both individually and collectively, to whoever will listen to the sound of their drums.

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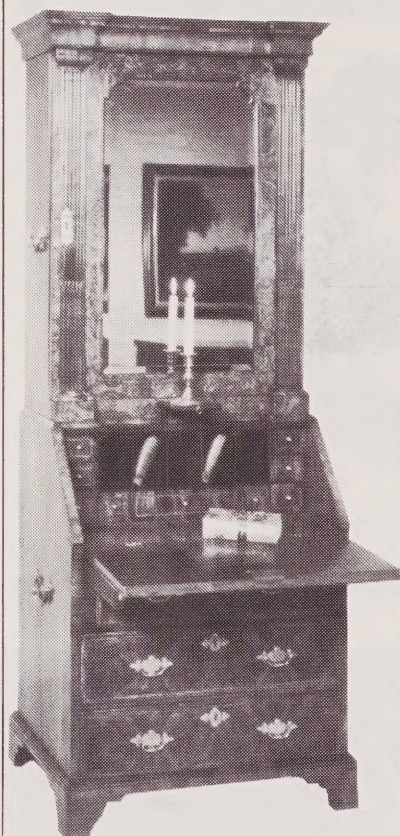




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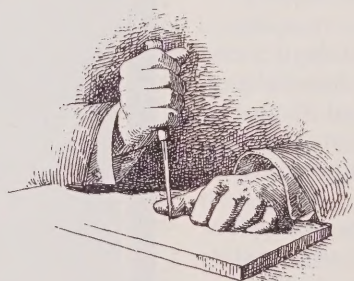


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